



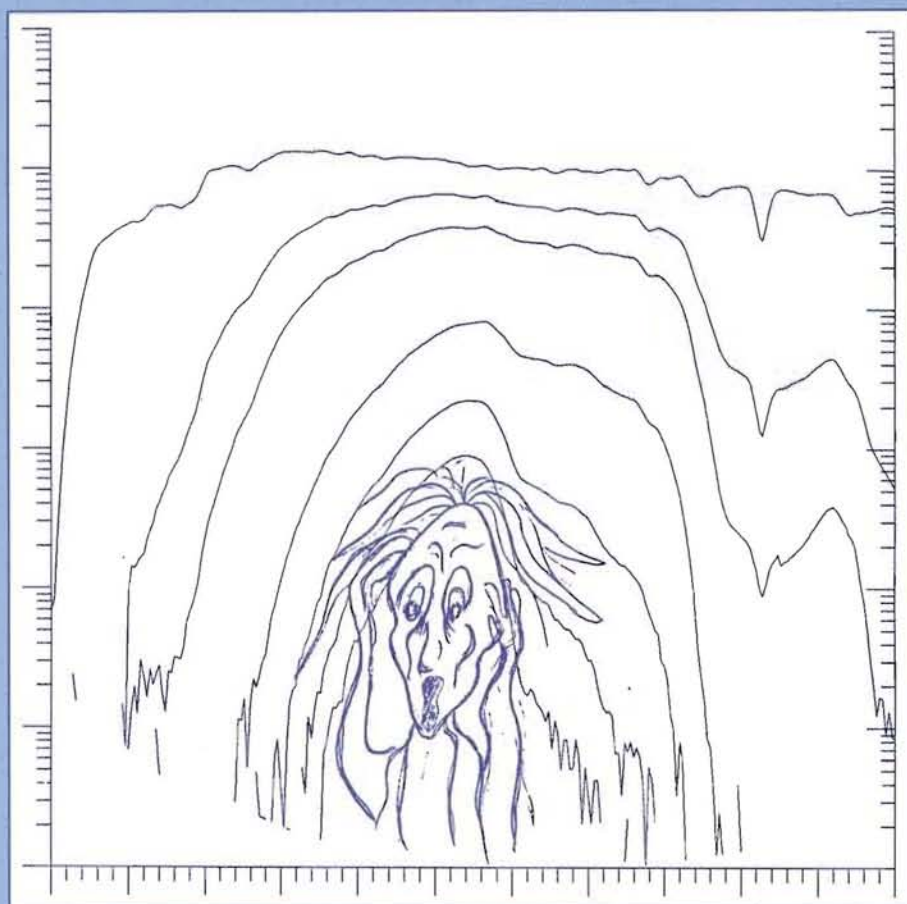
NORSK POLARINSTITUTT

# RAPPORTSERIE

NR. 101 - OSLO 1996

JO HØKEDAL:

**OBSERVATIONS OF SECCHI DISK DEPTH,  
SPECTRAL IRRADIANCE AND QUANTUM  
IRRADIANCE DURING KAREX 94.**





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**NORSK POLARINSTITUTT  
Oslo 1996**

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As a part of RUSNOP (Russian-Norwegian Oceanographic Program) the expedition KAREX-94 was carried out. In the period medio august – medio september works in several disciplines were done from the vessel “*Ivan Petrov*”.

This report contains the observations obtained from the norwegian part of the section for marine optics.

- Quantum irradiance on deck (table 3 through 19) was observed with a LI-190SA quantum sensor and LI-189 quantum meter (figure 1), both manufactured by LI-COR INC. The quantum irradiance is used as a reference to correct for changing conditions at the surface during the observation of the spectral irradiance.
- Underwater spectral irradiance (table 3 through 19 and figure 3 through 19) was observed (with 2 nm resolution) in several depths with a LI-1800UW underwater spectroradiometer (figure 1), also this manufactured by LI-COR.
- The Secchi disk depth (table 2) observed with a 25 cm disk from “Hydro-Bios”.

The positions of the stations are presented in figure 2, table 1 contains in addition the corresponding date, time and depth.

Figure 3 through 19 shows the spectral irradiance. For each station the irradiances for different depths are corrected for variations in atmospherical radiation. Values less than NEI (Noise Equivalent Irradiance) are masked out. Observations marked *0 m* are made just below the surface, observations marked *Surface* are made just above the surface.

Table 3 through 19 contains the spectral irradiance from 300 to 850 nm with 10 nm intervall, the calculated Photosyntetic Active Radiation (PAR), and the corresponding quantum irradiance on deck.



Figure 1: Photos of the LI-190SA and LI-189 (left), and the LI-1800UW (right).

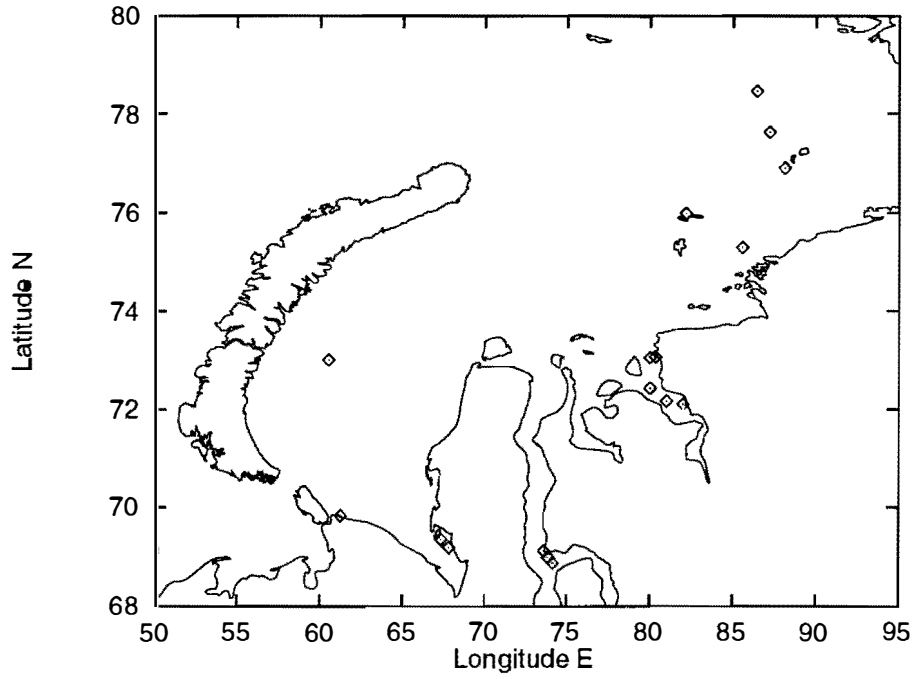


Figure 2: Simple map showing the localities of the stations.

Table 1: Table of stations, their positions and time of observations.

St.	Lat. N	Long. E	Date	Time [UTC]	Depth [m]
A	75°18.23'	85°32.56'	25/8	1134-1203	40
9	76°54.20'	88°10.74'	25/8	0717-0740	40
11	77°38.34'	87°18.07'	27/8	0609-0654	
21	78°27.85'	86°32.31	28/8	0703-0740	16
43	76°0.36'	83°15.10'	1/9	1004-1026	24
63	69°08.03'	73°38.08'	6/9	0417-0441	12
64	68°59.97'	73°52.7'	6/9	0646-0709	10
66	68°53.08'	74°10.88	6/9	1010-1039	9
B	73°03.91'	80°20.95'	11/9	0631-0708	21
77	73°02.95'	80°00.65'	11/9	1032-1101	21
83	72°05.97'	82°00.14'	12/9	0239-0300	9
84	72°10.00'	81°00.00'	12/9	0540-0607	11
85	72°26.01'	80°01.21'	12/9	1237-1254	9
109	73°00.01'	60°32.07'	16/9	0226-0401	113
123	69°21.85'	67°22.46'	21/9	0449-0509	9
124	69°12.08'	67°51.32'	21/9	0853-0905	12
C	69°49.85'	61°14.40'	27/9	1024-1047	11

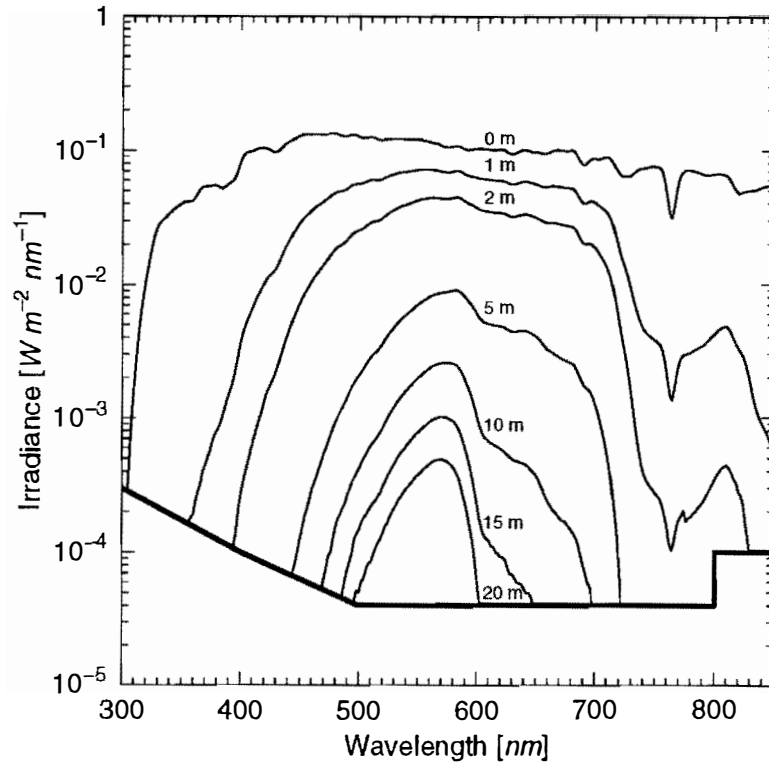


Figure 3: Station A.

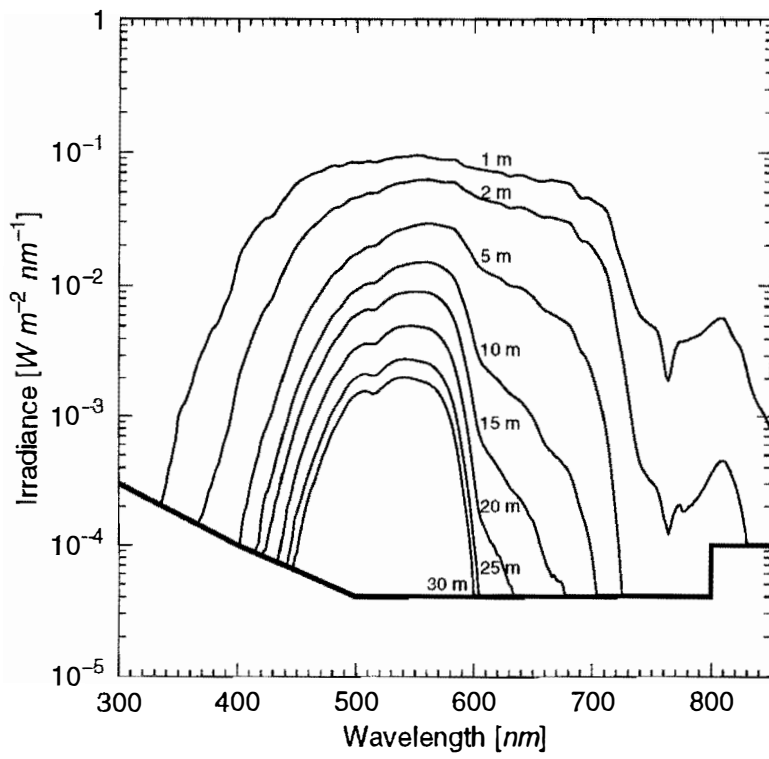


Figure 4: Station 009.

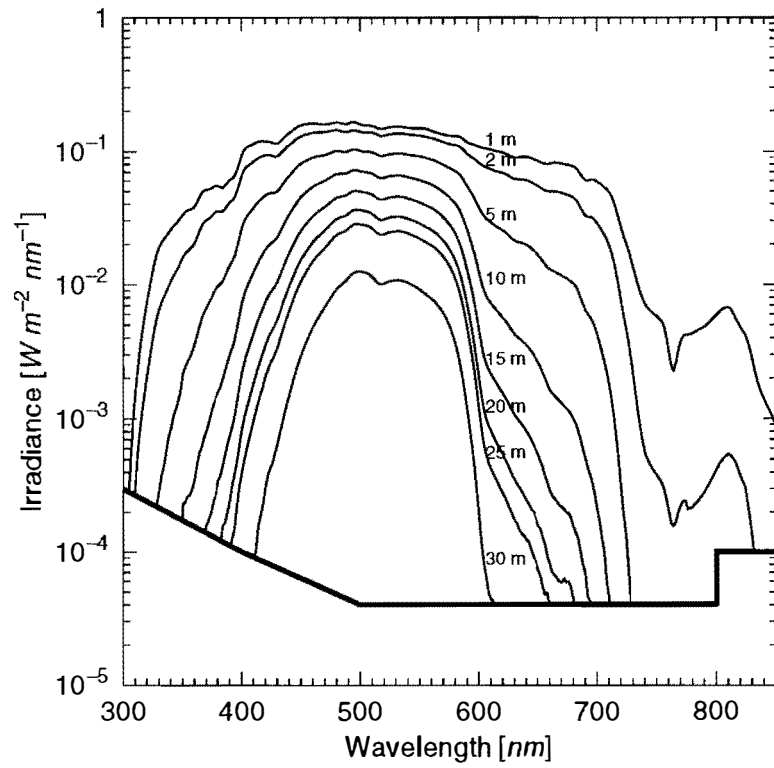


Figure 5: Station 011

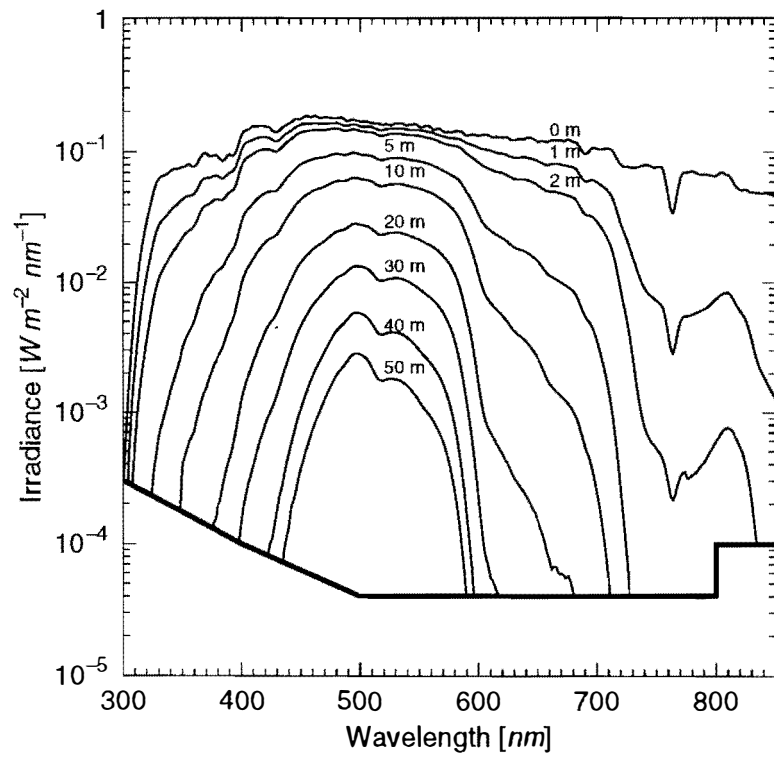


Figure 6: Station 021.

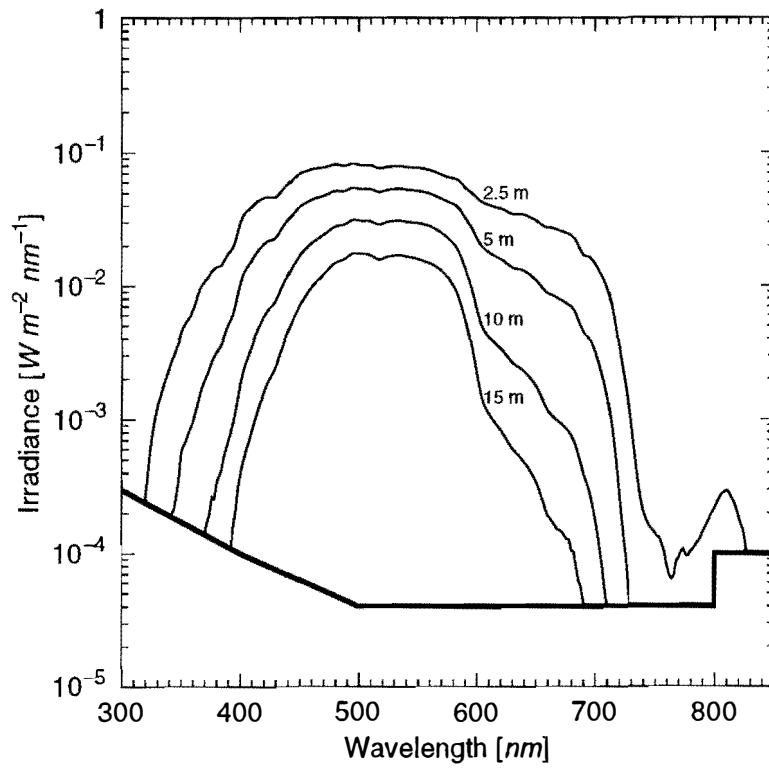


Figure 7: Station 043.

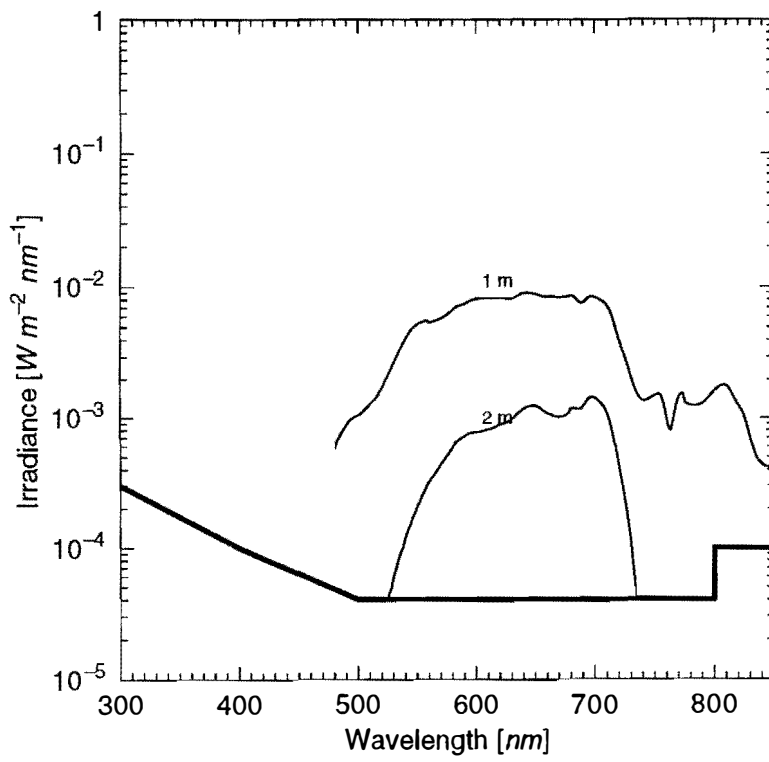


Figure 8: Station 063.



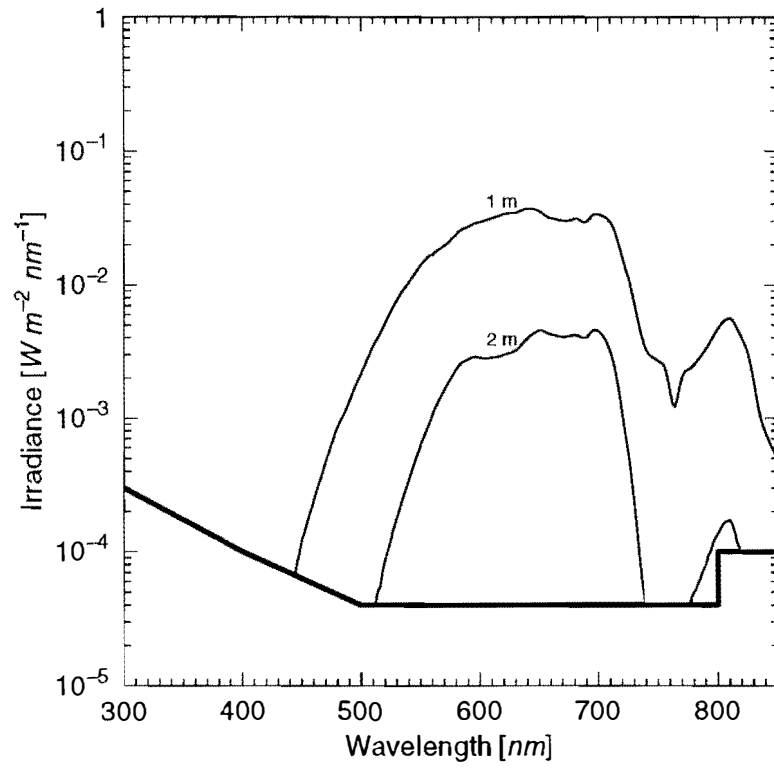


Figure 9: Station 064.

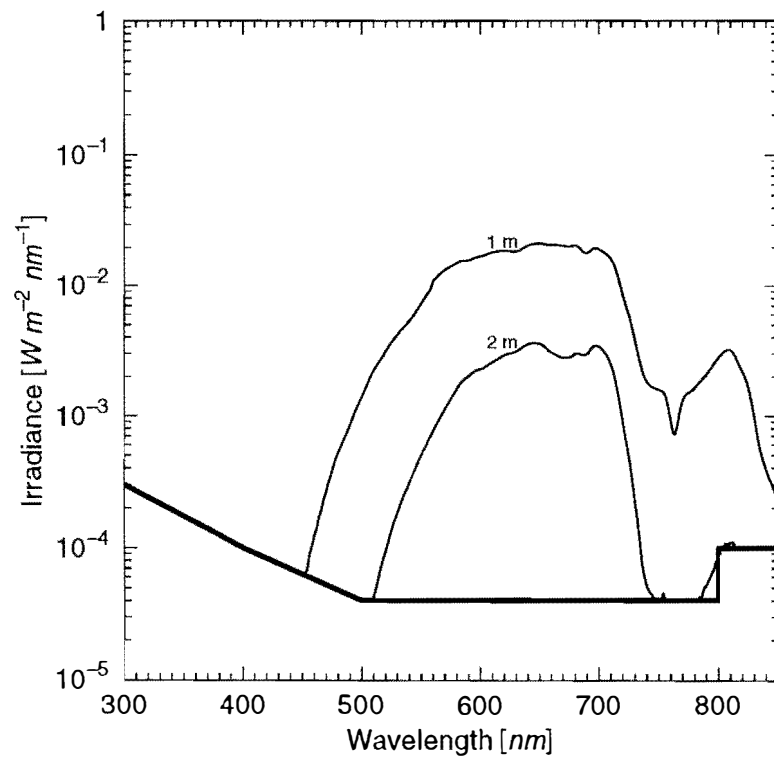


Figure 10: Station 066.

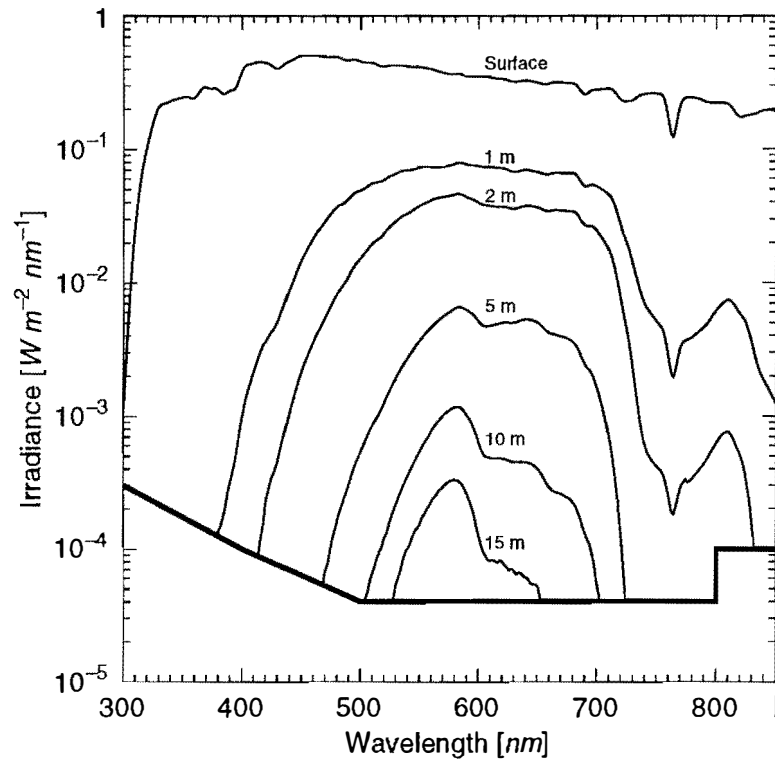


Figure 11: Station B.

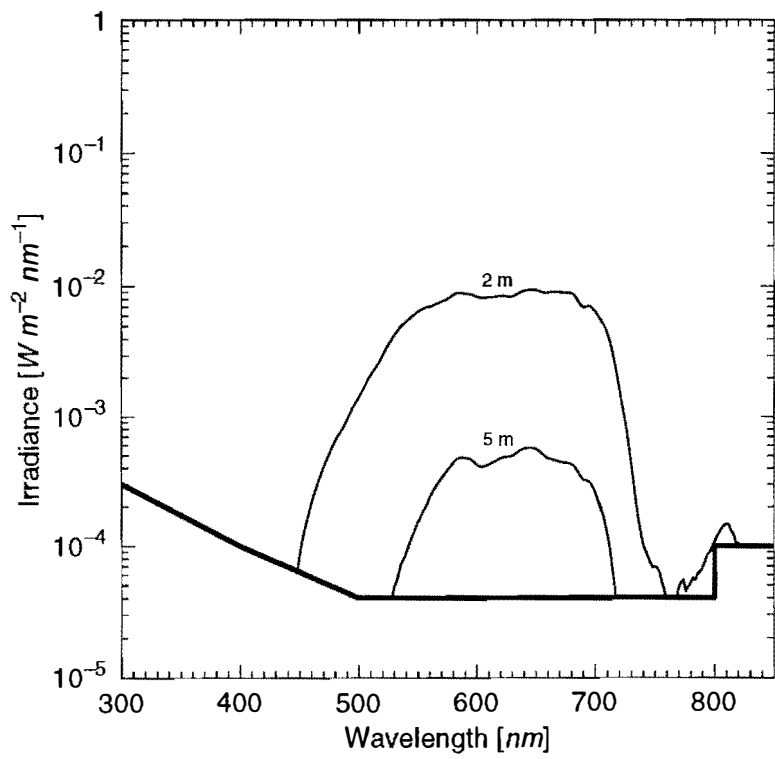


Figure 12: Station 077.

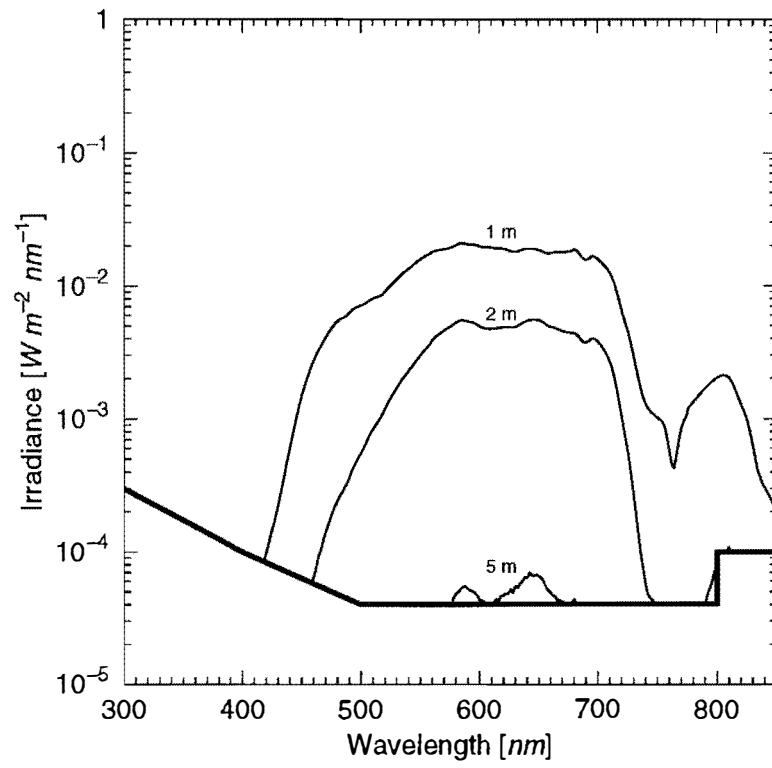


Figure 13: Station 083.

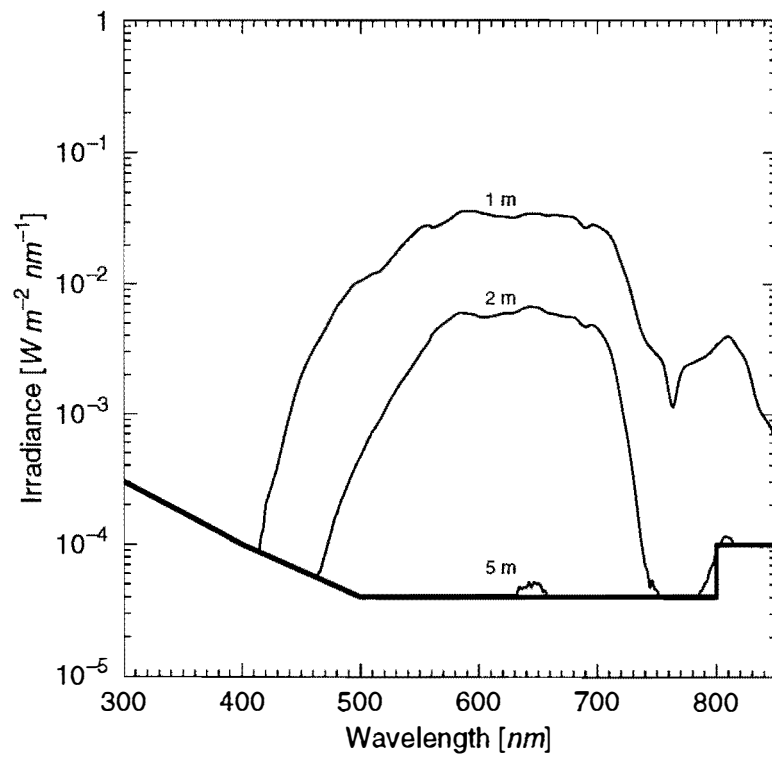


Figure 14: Station 084.

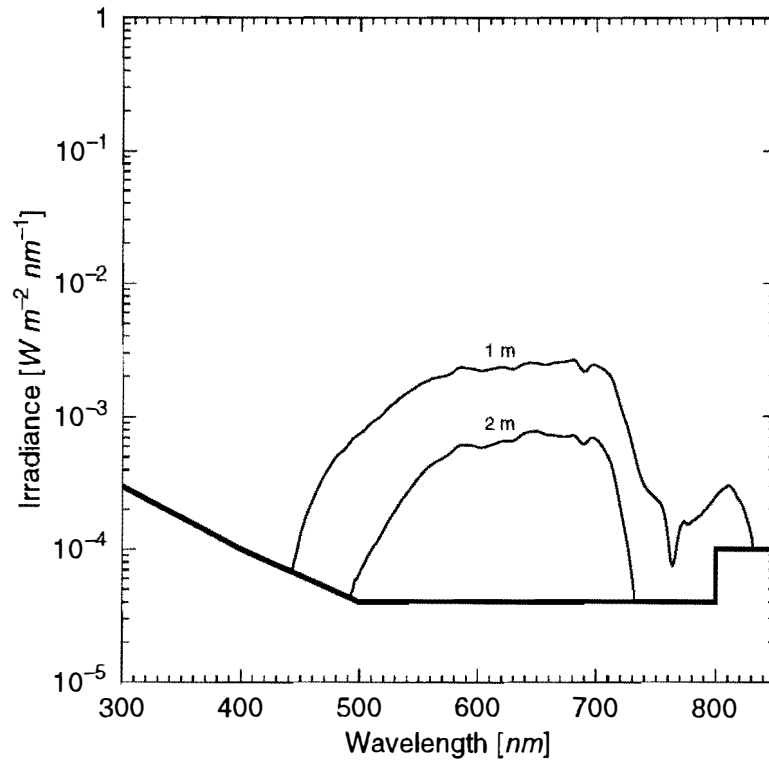


Figure 15: Station 085.

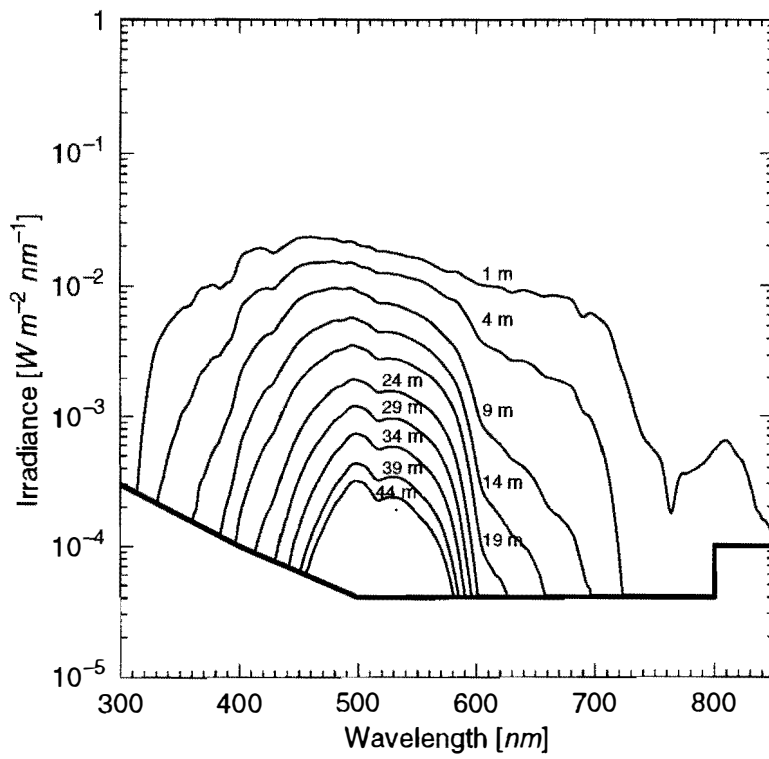


Figure 16: Station 109.

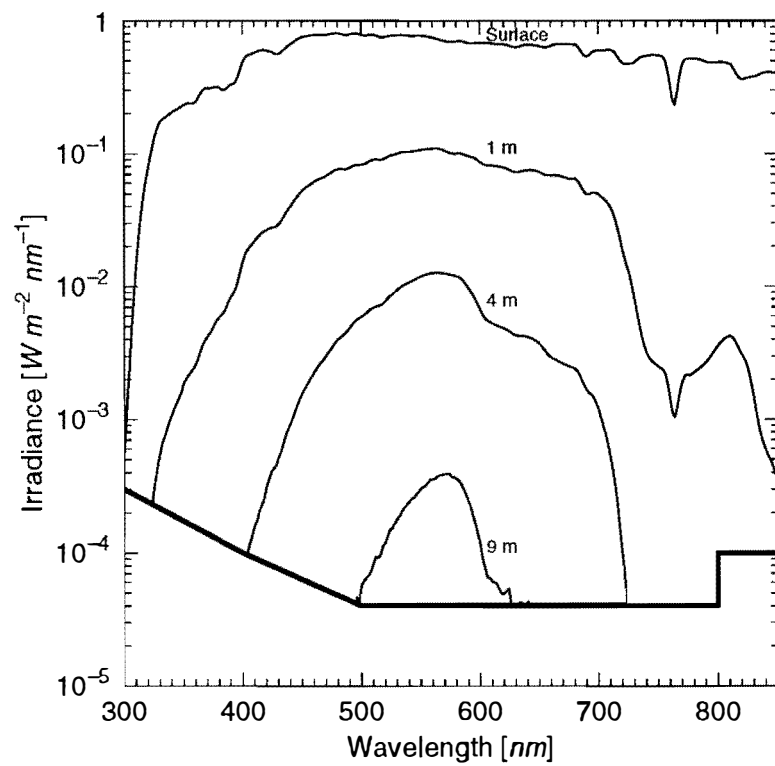


Figure 17: Station 123.

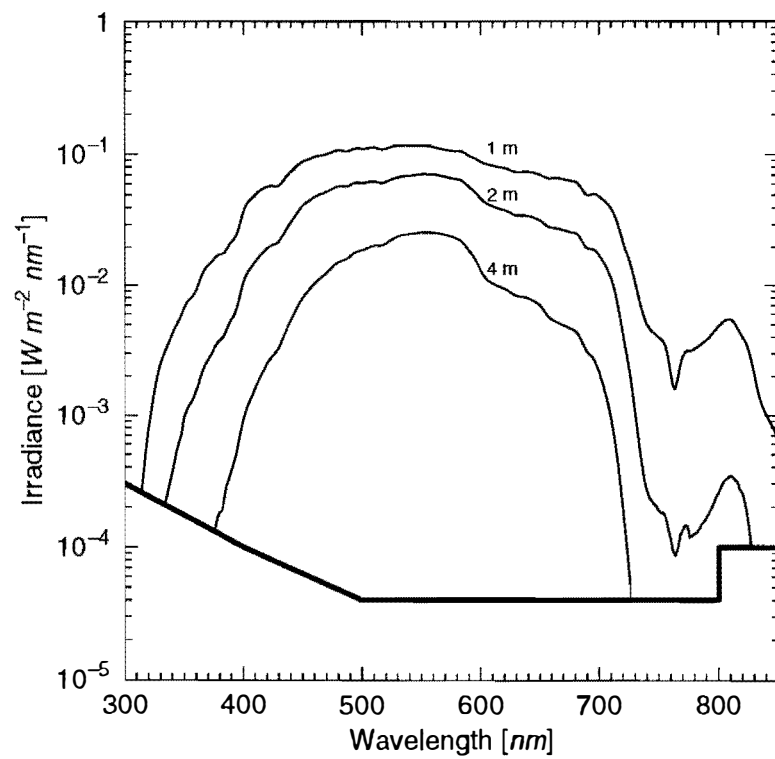


Figure 18: Station 124.

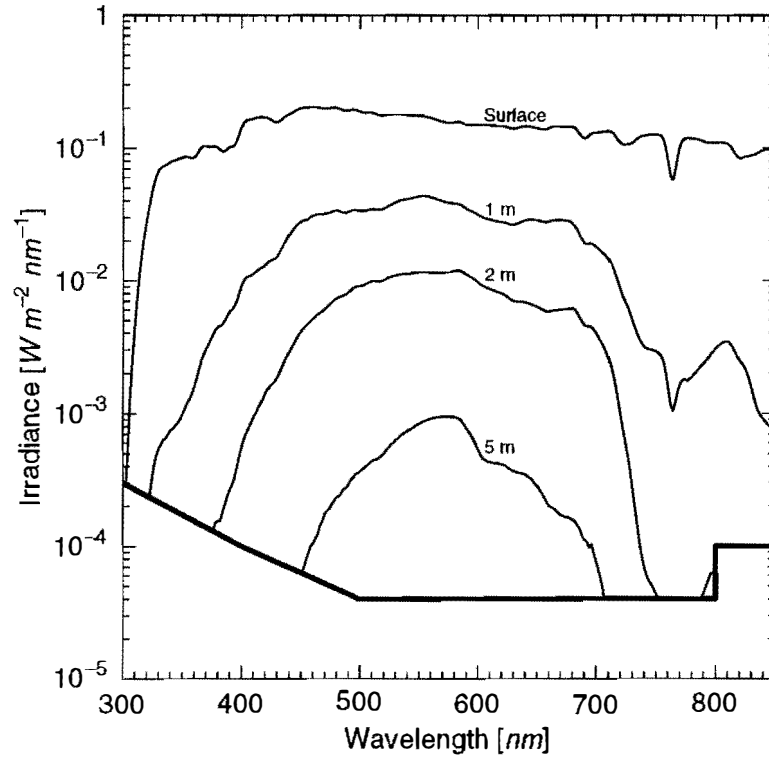


Figure 19: Station C.

Table 2: List of Secchi disk depths.

St.	Secchi [m]	St.	Secchi [m]
A	4	077	1.75
009	5.5	083	1
011	12	084	0.75
021	11	085	0.75
043	12	109	19
063	0.4	123	1.2
064	0.4	124	2
066	0.5	C	1.1
B	2.5		

Table 3: Station A.

Wavelength [nm]	Depth [m]						
	0	1	2	5	10	15	20
300	6.838e-05	-	-	-	-	-	-
310	1.754e-03	-	-	-	-	-	-
320	1.101e-02	-	-	-	-	-	-
330	2.734e-02	-	-	-	-	-	-
340	3.432e-02	-	-	-	-	-	-
350	4.008e-02	-	-	-	-	-	-
360	4.278e-02	-	-	-	-	-	-
370	5.379e-02	4.039e-04	-	-	-	-	-
380	5.415e-02	7.322e-04	-	-	-	-	-
390	5.654e-02	1.388e-03	-	-	-	-	-
400	8.289e-02	3.399e-03	2.301e-04	-	-	-	-
410	9.911e-02	6.143e-03	5.616e-04	-	-	-	-
420	1.038e-01	9.466e-03	1.173e-03	-	-	-	-
430	9.673e-02	1.222e-02	1.963e-03	-	-	-	-
440	1.147e-01	1.880e-02	3.750e-03	-	-	-	-
450	1.288e-01	2.668e-02	6.438e-03	1.135e-04	-	-	-
460	1.320e-01	3.301e-02	9.336e-03	2.642e-04	-	-	-
470	1.303e-01	3.817e-02	1.233e-02	4.828e-04	-	-	-
480	1.331e-01	4.436e-02	1.603e-02	8.422e-04	1.320e-04	-	-
490	1.276e-01	4.752e-02	1.885e-02	1.286e-03	2.296e-04	6.429e-05	-
500	1.254e-01	5.132e-02	2.201e-02	1.868e-03	3.641e-04	1.272e-04	4.095e-05
510	1.255e-01	5.501e-02	2.523e-02	2.558e-03	5.354e-04	1.912e-04	6.838e-05
520	1.192e-01	5.623e-02	2.736e-02	3.252e-03	7.307e-04	2.690e-04	1.123e-04
530	1.224e-01	6.110e-02	3.143e-02	4.323e-03	1.051e-03	4.028e-04	1.737e-04
540	1.206e-01	6.342e-02	3.416e-02	5.324e-03	1.378e-03	5.436e-04	2.441e-04
550	1.199e-01	6.564e-02	3.683e-02	6.357e-03	1.714e-03	6.824e-04	3.071e-04
560	1.145e-01	6.601e-02	3.833e-02	7.302e-03	2.037e-03	8.227e-04	3.735e-04
570	1.076e-01	6.355e-02	3.782e-02	7.760e-03	2.205e-03	8.842e-04	4.012e-04
580	1.073e-01	6.381e-02	3.842e-02	8.071e-03	2.163e-03	8.140e-04	3.446e-04
590	1.016e-01	6.011e-02	3.559e-02	7.049e-03	1.589e-03	4.997e-04	1.837e-04
600	1.029e-01	5.693e-02	3.194e-02	5.258e-03	8.390e-04	1.927e-04	5.018e-05
610	1.021e-01	5.523e-02	3.018e-02	4.492e-03	5.642e-04	1.062e-04	-
620	1.023e-01	5.419e-02	2.956e-02	4.310e-03	4.990e-04	8.049e-05	-
630	9.446e-02	5.087e-02	2.760e-02	3.924e-03	4.176e-04	5.995e-05	-
640	1.011e-01	5.351e-02	2.892e-02	3.995e-03	3.879e-04	4.643e-05	-
650	9.745e-02	5.083e-02	2.720e-02	3.592e-03	3.152e-04	-	-
660	9.652e-02	4.873e-02	2.502e-02	2.849e-03	1.990e-04	-	-
670	1.004e-01	4.864e-02	2.435e-02	2.499e-03	1.516e-04	-	-
680	1.009e-01	4.748e-02	2.335e-02	2.264e-03	1.229e-04	-	-
690	7.776e-02	3.649e-02	1.735e-02	1.551e-03	6.763e-05	-	-
700	8.679e-02	3.682e-02	1.601e-02	1.094e-03	-	-	-
710	8.935e-02	3.088e-02	1.125e-02	4.552e-04	-	-	-
720	6.656e-02	1.601e-02	4.210e-03	6.770e-05	-	-	-
730	6.582e-02	7.905e-03	1.187e-03	-	-	-	-
740	7.368e-02	4.188e-03	3.351e-04	-	-	-	-
750	7.581e-02	3.441e-03	2.361e-04	-	-	-	-
760	4.367e-02	1.803e-03	1.318e-04	-	-	-	-
770	6.097e-02	2.351e-03	1.498e-04	-	-	-	-
780	7.110e-02	2.818e-03	1.574e-04	-	-	-	-
790	6.654e-02	3.164e-03	2.025e-04	-	-	-	-
800	6.661e-02	3.890e-03	3.009e-04	-	-	-	-
810	6.495e-02	4.393e-03	3.831e-04	-	-	-	-
820	4.763e-02	2.966e-03	2.419e-04	-	-	-	-
830	5.049e-02	1.618e-03	-	-	-	-	-
840	5.301e-02	8.027e-04	-	-	-	-	-
850	5.262e-02	5.215e-04	-	-	-	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	149.8	65.05	32.53	4.51	0.84	0.24	0.11
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	227	207	196	202	194	198	185

Table 4: Station 009.

Wavelength [nm]	Depth [m]							
	1	2	5	10	15	20	25	30
320	5.035e-05	-	-	-	-	-	-	-
330	9.616e-05	-	-	-	-	-	-	-
340	3.000e-04	-	-	-	-	-	-	-
350	9.778e-04	-	-	-	-	-	-	-
360	1.623e-03	-	-	-	-	-	-	-
370	3.141e-03	1.625e-04	-	-	-	-	-	-
380	4.874e-03	3.267e-04	-	-	-	-	-	-
390	7.456e-03	6.522e-04	-	-	-	-	-	-
400	1.493e-02	1.761e-03	-	-	-	-	-	-
410	2.274e-02	3.453e-03	2.496e-04	-	-	-	-	-
420	2.987e-02	5.786e-03	6.072e-04	1.530e-04	-	-	-	-
430	3.348e-02	8.035e-03	1.071e-03	3.429e-04	1.566e-04	-	-	-
440	4.560e-02	1.319e-02	2.208e-03	7.808e-04	3.941e-04	1.450e-04	-	-
450	5.878e-02	1.958e-02	4.029e-03	1.586e-03	8.363e-04	3.684e-04	1.759e-04	8.629e-05
460	6.654e-02	2.529e-02	6.177e-03	2.672e-03	1.508e-03	7.058e-04	3.499e-04	2.322e-04
470	7.175e-02	3.020e-02	8.498e-03	3.976e-03	2.350e-03	1.167e-03	6.209e-04	4.205e-04
480	7.900e-02	3.645e-02	1.148e-02	5.724e-03	3.530e-03	1.859e-03	1.040e-03	7.358e-04
490	8.040e-02	3.978e-02	1.387e-02	7.269e-03	4.641e-03	2.559e-03	1.495e-03	1.077e-03
500	8.328e-02	4.409e-02	1.648e-02	8.899e-03	5.786e-03	3.264e-03	1.943e-03	1.433e-03
510	8.561e-02	4.770e-02	1.870e-02	9.992e-03	6.363e-03	3.560e-03	2.080e-03	1.516e-03
520	8.579e-02	4.925e-02	2.018e-02	1.073e-02	6.721e-03	3.744e-03	2.151e-03	1.558e-03
530	9.027e-02	5.468e-02	2.347e-02	1.260e-02	7.905e-03	4.447e-03	2.573e-03	1.870e-03
540	9.255e-02	5.726e-02	2.548e-02	1.366e-02	8.495e-03	4.772e-03	2.733e-03	1.985e-03
550	9.499e-02	5.959e-02	2.714e-02	1.429e-02	8.671e-03	4.779e-03	2.685e-03	1.920e-03
560	9.142e-02	6.063e-02	2.806e-02	1.447e-02	8.569e-03	4.654e-03	2.562e-03	1.797e-03
570	8.877e-02	5.842e-02	2.732e-02	1.362e-02	7.777e-03	4.093e-03	2.177e-03	1.496e-03
580	8.821e-02	5.795e-02	2.612e-02	1.179e-02	6.105e-03	2.954e-03	1.442e-03	9.271e-04
590	8.023e-02	5.166e-02	2.104e-02	7.652e-03	3.254e-03	1.302e-03	5.367e-04	2.978e-04
600	7.558e-02	4.576e-02	1.507e-02	3.737e-03	1.122e-03	3.278e-04	1.037e-04	-
610	7.307e-02	4.251e-02	1.223e-02	2.322e-03	5.395e-04	1.253e-04	-	-
620	7.106e-02	4.053e-02	1.111e-02	1.886e-03	3.907e-04	8.049e-05	-	-
630	6.586e-02	3.706e-02	9.636e-03	1.462e-03	2.744e-04	4.742e-05	-	-
640	6.712e-02	3.754e-02	9.239e-03	1.255e-03	2.167e-04	-	-	-
650	6.233e-02	3.440e-02	7.909e-03	9.457e-04	1.489e-04	-	-	-
660	6.048e-02	3.157e-02	6.291e-03	5.898e-04	7.530e-05	-	-	-
670	6.063e-02	3.076e-02	5.654e-03	4.628e-04	5.163e-05	-	-	-
680	5.820e-02	2.904e-02	4.967e-03	3.666e-04	-	-	-	-
690	4.500e-02	2.132e-02	3.195e-03	1.884e-04	-	-	-	-
700	4.357e-02	1.880e-02	2.112e-03	8.153e-05	-	-	-	-
710	3.775e-02	1.322e-02	8.954e-04	-	-	-	-	-
720	1.974e-02	4.977e-03	1.556e-04	-	-	-	-	-
730	1.037e-02	1.452e-03	-	-	-	-	-	-
740	6.006e-03	4.247e-04	-	-	-	-	-	-
750	5.025e-03	3.019e-04	-	-	-	-	-	-
760	2.716e-03	1.606e-04	-	-	-	-	-	-
770	3.418e-03	1.848e-04	-	-	-	-	-	-
780	3.923e-03	1.874e-04	-	-	-	-	-	-
790	4.306e-03	2.386e-04	-	-	-	-	-	-
800	5.221e-03	3.450e-04	-	-	-	-	-	-
810	5.766e-03	4.390e-04	-	-	-	-	-	-
820	3.930e-03	2.922e-04	-	-	-	-	-	-
830	2.312e-03	-	-	-	-	-	-	-
840	1.207e-03	-	-	-	-	-	-	-
850	8.024e-04	-	-	-	-	-	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	94.91	51.18	17.21	6.96	3.85	2.00	1.10	0.77
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	215	209	206	207	206	206	208	210



Table 5: Station 011.

Wavelength [nm]	Depth [m]							
	1	2	5	10	15	20	25	30
300	5.861e-05	-	-	-	-	-	-	-
310	1.513e-03	3.158e-04	-	-	-	-	-	-
320	7.522e-03	2.213e-03	-	-	-	-	-	-
330	1.901e-02	6.794e-03	2.645e-04	-	-	-	-	-
340	2.580e-02	1.107e-02	7.679e-04	-	-	-	-	-
350	3.324e-02	1.652e-02	1.979e-03	2.095e-04	-	-	-	-
360	3.840e-02	2.137e-02	3.323e-03	3.187e-04	-	-	-	-
370	5.142e-02	3.159e-02	6.198e-03	7.350e-04	-	-	-	-
380	5.485e-02	3.679e-02	8.949e-03	1.434e-03	3.201e-04	-	-	-
390	6.116e-02	4.307e-02	1.286e-02	2.709e-03	6.898e-04	2.320e-04	-	-
400	9.321e-02	6.858e-02	2.421e-02	6.473e-03	1.981e-03	7.786e-04	3.661e-04	-
410	1.139e-01	8.731e-02	3.466e-02	1.123e-02	4.004e-03	1.742e-03	9.048e-04	-
420	1.187e-01	9.782e-02	4.284e-02	1.653e-02	6.896e-03	3.372e-03	1.925e-03	2.913e-04
430	1.141e-01	9.571e-02	4.595e-02	2.047e-02	9.699e-03	5.216e-03	3.175e-03	6.096e-04
440	1.372e-01	1.161e-01	6.047e-02	3.022e-02	1.589e-02	9.264e-03	5.990e-03	1.409e-03
450	1.571e-01	1.355e-01	7.474e-02	4.107e-02	2.343e-02	1.462e-02	9.953e-03	2.788e-03
460	1.618e-01	1.442e-01	8.290e-02	4.910e-02	3.001e-02	1.978e-02	1.402e-02	4.557e-03
470	1.587e-01	1.456e-01	8.672e-02	5.446e-02	3.526e-02	2.414e-02	1.763e-02	6.413e-03
480	1.647e-01	1.511e-01	9.297e-02	6.123e-02	4.137e-02	2.950e-02	2.197e-02	8.764e-03
490	1.618e-01	1.467e-01	9.269e-02	6.309e-02	4.421e-02	3.231e-02	2.456e-02	1.061e-02
500	1.589e-01	1.462e-01	9.301e-02	6.419e-02	4.596e-02	3.422e-02	2.632e-02	1.180e-02
510	1.551e-01	1.446e-01	9.074e-02	6.164e-02	4.359e-02	3.199e-02	2.451e-02	1.072e-02
520	1.480e-01	1.370e-01	8.564e-02	5.747e-02	4.027e-02	2.920e-02	2.221e-02	9.594e-03
530	1.537e-01	1.419e-01	8.884e-02	5.973e-02	4.208e-02	3.060e-02	2.334e-02	1.016e-02
540	1.503e-01	1.401e-01	8.714e-02	5.799e-02	4.073e-02	2.950e-02	2.254e-02	9.720e-03
550	1.496e-01	1.374e-01	8.469e-02	5.504e-02	3.800e-02	2.704e-02	2.053e-02	8.623e-03
560	1.426e-01	1.317e-01	8.016e-02	5.094e-02	3.454e-02	2.424e-02	1.832e-02	7.385e-03
570	1.340e-01	1.225e-01	7.301e-02	4.453e-02	2.934e-02	2.011e-02	1.505e-02	5.736e-03
580	1.308e-01	1.161e-01	6.538e-02	3.636e-02	2.220e-02	1.428e-02	1.027e-02	3.424e-03
590	1.174e-01	1.002e-01	5.018e-02	2.311e-02	1.173e-02	6.679e-03	4.443e-03	1.112e-03
600	1.083e-01	8.530e-02	3.443e-02	1.094e-02	4.158e-03	1.899e-03	1.099e-03	1.773e-04
610	1.033e-01	7.647e-02	2.671e-02	6.535e-03	1.981e-03	7.700e-04	3.975e-04	4.176e-05
620	9.810e-02	7.158e-02	2.326e-02	5.113e-03	1.419e-03	5.131e-04	2.582e-04	-
630	8.956e-02	6.444e-02	1.947e-02	3.848e-03	9.755e-04	3.319e-04	1.609e-04	-
640	9.100e-02	6.297e-02	1.810e-02	3.188e-03	7.359e-04	2.321e-04	1.152e-04	-
650	8.444e-02	5.693e-02	1.522e-02	2.366e-03	4.991e-04	1.489e-04	6.830e-05	-
660	8.068e-02	5.168e-02	1.186e-02	1.476e-03	2.689e-04	7.709e-05	-	-
670	8.070e-02	5.023e-02	1.067e-02	1.169e-03	2.028e-04	5.532e-05	-	-
680	7.694e-02	4.613e-02	9.270e-03	8.881e-04	1.428e-04	4.131e-05	-	-
690	6.001e-02	3.381e-02	5.888e-03	4.544e-04	6.340e-05	-	-	-
700	5.867e-02	2.950e-02	3.826e-03	1.884e-04	-	-	-	-
710	4.864e-02	2.008e-02	1.618e-03	4.121e-05	-	-	-	-
720	2.637e-02	7.704e-03	2.821e-04	-	-	-	-	-
730	1.332e-02	2.212e-03	-	-	-	-	-	-
740	7.087e-03	5.887e-04	-	-	-	-	-	-
750	5.740e-03	3.944e-04	-	-	-	-	-	-
760	3.126e-03	2.140e-04	-	-	-	-	-	-
770	3.786e-03	2.322e-04	-	-	-	-	-	-
780	4.323e-03	2.260e-04	-	-	-	-	-	-
790	4.855e-03	2.925e-04	-	-	-	-	-	-
800	5.971e-03	4.342e-04	-	-	-	-	-	-
810	6.758e-03	5.686e-04	-	-	-	-	-	-
820	4.746e-03	3.900e-04	-	-	-	-	-	-
830	2.693e-03	1.323e-04	-	-	-	-	-	-
840	1.362e-03	-	-	-	-	-	-	-
850	8.657e-04	-	-	-	-	-	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	164.53	136.50	69.45	38.44	24.43	16.80	12.44	4.90
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	264	275	243	239	244	251	247	249

Table 6: Station 021.

Wavelength [nm]	Depth [m]								
	0	1	2	5	10	20	30	40	50
300	2.344e-04	-	-	-	-	-	-	-	-
310	6.591e-03	2.119e-03	5.569e-04	-	-	-	-	-	-
320	3.040e-02	1.133e-02	3.647e-03	-	-	-	-	-	-
330	6.279e-02	2.785e-02	1.072e-02	6.780e-04	-	-	-	-	-
340	7.205e-02	3.605e-02	1.634e-02	1.541e-03	-	-	-	-	-
350	7.694e-02	4.354e-02	2.291e-02	3.345e-03	4.190e-04	-	-	-	-
360	7.728e-02	4.843e-02	2.822e-02	5.378e-03	7.630e-04	-	-	-	-
370	9.712e-02	6.311e-02	4.021e-02	9.600e-03	1.617e-03	-	-	-	-
380	9.234e-02	6.560e-02	4.458e-02	1.308e-02	2.814e-03	1.934e-04	-	-	-
390	9.536e-02	6.914e-02	5.035e-02	1.769e-02	4.747e-03	4.327e-04	-	-	-
400	1.321e-01	1.013e-01	7.782e-02	3.147e-02	1.017e-02	1.203e-03	1.627e-04	-	-
410	1.545e-01	1.213e-01	9.666e-02	4.354e-02	1.607e-02	2.413e-03	4.264e-04	-	-
420	1.540e-01	1.272e-01	1.049e-01	5.214e-02	2.180e-02	4.117e-03	8.935e-04	-	-
430	1.391e-01	1.179e-01	1.008e-01	5.450e-02	2.521e-02	5.766e-03	1.511e-03	1.990e-04	-
440	1.616e-01	1.387e-01	1.213e-01	7.013e-02	3.539e-02	9.439e-03	2.967e-03	5.391e-04	1.524e-04
450	1.756e-01	1.572e-01	1.396e-01	8.532e-02	4.636e-02	1.410e-02	5.111e-03	1.175e-03	4.148e-04
460	1.833e-01	1.619e-01	1.465e-01	9.329e-02	5.354e-02	1.804e-02	7.383e-03	2.126e-03	8.294e-04
470	1.817e-01	1.601e-01	1.458e-01	9.642e-02	5.783e-02	2.106e-02	9.461e-03	3.272e-03	1.398e-03
480	1.778e-01	1.636e-01	1.509e-01	1.024e-01	6.368e-02	2.493e-02	1.198e-02	4.727e-03	2.173e-03
490	1.694e-01	1.558e-01	1.452e-01	1.012e-01	6.505e-02	2.694e-02	1.370e-02	5.914e-03	2.870e-03
500	1.688e-01	1.536e-01	1.438e-01	1.011e-01	6.624e-02	2.818e-02	1.478e-02	6.469e-03	3.159e-03
510	1.634e-01	1.518e-01	1.409e-01	9.843e-02	6.330e-02	2.616e-02	1.319e-02	5.395e-03	2.507e-03
520	1.593e-01	1.450e-01	1.332e-01	9.243e-02	5.871e-02	2.375e-02	1.150e-02	4.464e-03	1.986e-03
530	1.638e-01	1.481e-01	1.376e-01	9.546e-02	6.076e-02	2.466e-02	1.201e-02	4.611e-03	2.038e-03
540	1.577e-01	1.453e-01	1.347e-01	9.327e-02	5.904e-02	2.355e-02	1.139e-02	4.193e-03	1.810e-03
550	1.535e-01	1.440e-01	1.325e-01	9.038e-02	5.616e-02	2.160e-02	9.885e-03	3.376e-03	1.376e-03
560	1.508e-01	1.386e-01	1.269e-01	8.519e-02	5.210e-02	1.935e-02	8.396e-03	2.657e-03	1.031e-03
570	1.418e-01	1.293e-01	1.171e-01	7.715e-02	4.575e-02	1.605e-02	6.532e-03	1.860e-03	6.757e-04
580	1.433e-01	1.251e-01	1.117e-01	6.885e-02	3.763e-02	1.141e-02	3.917e-03	8.811e-04	2.778e-04
590	1.310e-01	1.152e-01	9.748e-02	5.306e-02	2.436e-02	5.498e-03	1.348e-03	1.851e-04	4.038e-05
600	1.323e-01	1.063e-01	8.368e-02	3.577e-02	1.197e-02	1.644e-03	2.442e-04	-	-
610	1.297e-01	1.014e-01	7.474e-02	2.732e-02	7.343e-03	6.965e-04	6.180e-05	-	-
620	1.276e-01	9.628e-02	7.012e-02	2.383e-02	5.817e-03	4.779e-04	4.360e-05	-	-
630	1.214e-01	8.952e-02	6.331e-02	2.007e-02	4.436e-03	3.116e-04	-	-	-
640	1.262e-01	9.012e-02	6.250e-02	1.838e-02	3.683e-03	2.287e-04	-	-	-
650	1.182e-01	8.509e-02	5.704e-02	1.547e-02	2.774e-03	1.489e-04	-	-	-
660	1.195e-01	7.964e-02	5.113e-02	1.196e-02	1.773e-03	7.530e-05	-	-	-
670	1.220e-01	8.006e-02	4.946e-02	1.057e-02	1.403e-03	5.901e-05	-	-	-
680	1.179e-01	7.640e-02	4.610e-02	9.067e-03	1.083e-03	4.303e-05	-	-	-
690	9.597e-02	5.963e-02	3.431e-02	5.816e-03	5.794e-04	-	-	-	-
700	1.048e-01	5.910e-02	3.033e-02	3.795e-03	2.591e-04	-	-	-	-
710	1.054e-01	4.980e-02	2.130e-02	1.569e-03	5.432e-05	-	-	-	-
720	8.048e-02	2.870e-02	8.775e-03	2.755e-04	-	-	-	-	-
730	7.608e-02	1.571e-02	2.750e-03	-	-	-	-	-	-
740	7.953e-02	8.889e-03	7.811e-04	-	-	-	-	-	-
750	7.708e-02	7.159e-03	5.299e-04	-	-	-	-	-	-
760	4.637e-02	3.935e-03	2.905e-04	-	-	-	-	-	-
770	6.282e-02	4.878e-03	3.221e-04	-	-	-	-	-	-
780	7.175e-02	5.597e-03	3.320e-04	-	-	-	-	-	-
790	6.788e-02	6.139e-03	4.152e-04	-	-	-	-	-	-
800	6.600e-02	7.351e-03	5.996e-04	-	-	-	-	-	-
810	6.749e-02	8.276e-03	7.721e-04	-	-	-	-	-	-
820	5.218e-02	5.992e-03	5.442e-04	-	-	-	-	-	-
830	5.008e-02	3.560e-03	2.054e-04	-	-	-	-	-	-
840	4.938e-02	1.889e-03	-	-	-	-	-	-	-
850	4.660e-02	1.246e-03	-	-	-	-	-	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	198.14	162.60	135.53	75.49	40.76	14.12	6.26	2.22	0.97
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	254	252	256	269	267	251	282	284	286

Table 7: Station 043.

Wavelength [nm]	Depth [m]			
	2.5	5	10	15
320	2.643e-04	-	-	-
330	1.240e-03	-	-	-
340	2.433e-03	-	-	-
350	4.417e-03	6.146e-04	-	-
360	6.543e-03	1.061e-03	-	-
370	1.081e-02	2.163e-03	-	-
380	1.386e-02	3.517e-03	3.081e-04	-
390	1.767e-02	5.576e-03	6.471e-04	-
400	2.998e-02	1.131e-02	1.729e-03	3.207e-04
410	3.985e-02	1.726e-02	3.323e-03	6.926e-04
420	4.619e-02	2.260e-02	5.361e-03	1.336e-03
430	4.680e-02	2.527e-02	7.072e-03	2.073e-03
440	5.864e-02	3.419e-02	1.097e-02	3.694e-03
450	6.973e-02	4.299e-02	1.548e-02	5.836e-03
460	7.517e-02	4.854e-02	1.916e-02	7.966e-03
470	7.729e-02	5.175e-02	2.204e-02	9.920e-03
480	8.149e-02	5.647e-02	2.545e-02	1.215e-02
490	8.049e-02	5.733e-02	2.699e-02	1.341e-02
500	8.072e-02	5.853e-02	2.821e-02	1.428e-02
510	8.022e-02	5.827e-02	2.782e-02	1.386e-02
520	7.658e-02	5.592e-02	2.670e-02	1.307e-02
530	7.903e-02	5.839e-02	2.804e-02	1.380e-02
540	7.789e-02	5.766e-02	2.759e-02	1.360e-02
550	7.690e-02	5.654e-02	2.698e-02	1.299e-02
560	7.405e-02	5.378e-02	2.561e-02	1.208e-02
570	6.825e-02	4.922e-02	2.278e-02	1.057e-02
580	6.420e-02	4.482e-02	1.897e-02	8.214e-03
590	5.487e-02	3.523e-02	1.232e-02	4.577e-03
600	4.570e-02	2.470e-02	6.090e-03	1.733e-03
610	4.067e-02	1.949e-02	3.780e-03	8.950e-04
620	3.823e-02	1.736e-02	3.064e-03	6.781e-04
630	3.464e-02	1.491e-02	2.398e-03	4.908e-04
640	3.424e-02	1.406e-02	2.070e-03	3.900e-04
650	3.091e-02	1.200e-02	1.598e-03	2.795e-04
660	2.736e-02	9.561e-03	1.049e-03	1.560e-04
670	2.603e-02	8.626e-03	8.608e-04	1.217e-04
680	2.393e-02	7.570e-03	6.764e-04	8.571e-05
690	1.712e-02	4.942e-03	3.593e-04	-
700	1.459e-02	3.414e-03	1.641e-04	-
710	9.603e-03	1.566e-03	-	-
720	3.422e-03	3.035e-04	-	-
730	8.729e-04	-	-	-
740	2.071e-04	-	-	-
750	1.402e-04	-	-	-
760	8.007e-05	-	-	-
770	9.214e-05	-	-	-
780	1.044e-04	-	-	-
790	1.437e-04	-	-	-
800	2.177e-04	-	-	-
810	2.953e-04	-	-	-
820	1.890e-04	-	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	73.19	44.99	17.53	7.76
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	169	184	154	138

Table 8: Station 063.

Wavelength [nm]	Depth [m]	
	1	2
480	5.876e-04	-
490	8.657e-04	-
500	1.038e-03	-
510	1.264e-03	-
520	1.682e-03	-
530	2.647e-03	-
540	4.031e-03	7.581e-05
550	5.237e-03	1.318e-04
560	5.407e-03	2.018e-04
570	5.817e-03	2.776e-04
580	6.724e-03	3.748e-04
590	7.451e-03	4.532e-04
600	8.090e-03	4.863e-04
610	8.275e-03	5.131e-04
620	8.287e-03	5.569e-04
630	8.162e-03	6.107e-04
640	8.994e-03	7.387e-04
650	8.891e-03	7.870e-04
660	8.419e-03	6.879e-04
670	8.347e-03	6.412e-04
680	8.614e-03	7.404e-04
690	7.596e-03	7.619e-04
700	8.402e-03	9.098e-04
710	7.270e-03	6.968e-04
720	4.095e-03	2.702e-04
730	2.174e-03	7.056e-05
740	1.360e-03	-
750	1.476e-03	-
760	1.032e-03	-
770	1.411e-03	-
780	1.258e-03	-
790	1.282e-03	-
800	1.597e-03	-
810	1.809e-03	-
820	1.273e-03	-
830	7.289e-04	-
840	4.418e-04	-
850	4.223e-04	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	7.09	0.45
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	400	252

Table 9: Station 064.

Wavelength [nm]	Depth [m]	
	1	2
440	5.353e-05	-
450	1.235e-04	-
460	2.479e-04	-
470	4.820e-04	-
480	8.665e-04	-
490	1.356e-03	-
500	2.186e-03	-
510	3.520e-03	-
520	5.221e-03	7.837e-05
530	7.780e-03	1.654e-04
540	1.054e-02	3.156e-04
550	1.410e-02	5.759e-04
560	1.680e-02	9.766e-04
570	1.975e-02	1.482e-03
580	2.398e-02	2.103e-03
590	2.728e-02	2.498e-03
600	2.968e-02	2.552e-03
610	3.175e-02	2.567e-03
620	3.394e-02	2.696e-03
630	3.477e-02	2.918e-03
640	3.720e-02	3.600e-03
650	3.556e-02	4.106e-03
660	3.158e-02	3.816e-03
670	3.020e-02	3.658e-03
680	3.155e-02	3.789e-03
690	2.969e-02	3.650e-03
700	3.383e-02	4.034e-03
710	2.924e-02	2.793e-03
720	1.581e-02	9.443e-04
730	7.200e-03	2.050e-04
740	3.232e-03	-
750	2.673e-03	-
760	1.548e-03	-
770	2.028e-03	-
780	2.508e-03	4.444e-05
790	3.316e-03	7.210e-05
800	4.699e-03	1.227e-04
810	5.608e-03	1.556e-04
820	3.927e-03	-
830	1.828e-03	-
840	7.586e-04	-
850	4.740e-04	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	24.88	2.33
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	660	593

Table 10: Station 066.

Wavelength [nm]	Depth [m]	
	1	2
450	4.580e-05	-
460	1.231e-04	-
470	2.656e-04	-
480	5.193e-04	-
490	8.443e-04	-
500	1.392e-03	-
510	2.240e-03	-
520	3.120e-03	8.472e-05
530	4.210e-03	1.671e-04
540	5.362e-03	2.804e-04
550	7.298e-03	4.499e-04
560	1.079e-02	6.900e-04
570	1.324e-02	1.015e-03
580	1.505e-02	1.456e-03
590	1.575e-02	1.835e-03
600	1.703e-02	2.073e-03
610	1.840e-02	2.343e-03
620	1.890e-02	2.647e-03
630	1.869e-02	2.824e-03
640	2.078e-02	3.227e-03
650	2.170e-02	3.252e-03
660	2.091e-02	2.773e-03
670	2.058e-02	2.533e-03
680	2.077e-02	2.732e-03
690	1.800e-02	2.693e-03
700	1.931e-02	3.088e-03
710	1.618e-02	2.262e-03
720	8.430e-03	8.194e-04
730	3.891e-03	2.068e-04
740	1.838e-03	4.651e-05
750	1.595e-03	-
760	9.460e-04	-
770	1.303e-03	-
780	1.641e-03	-
790	2.084e-03	4.653e-05
800	2.797e-03	7.629e-05
810	3.231e-03	-
820	2.195e-03	-
830	1.002e-03	-
840	3.871e-04	-
850	2.302e-04	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	14.91	1.84
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	340	307

Table 11: Station B.

Wavelength [nm]	Depth [m]					
	Surface	1	2	5	10	15
300	1.118e-03	-	-	-	-	-
310	2.726e-02	-	-	-	-	-
320	1.071e-01	-	-	-	-	-
330	2.097e-01	-	-	-	-	-
340	2.308e-01	-	-	-	-	-
350	2.431e-01	-	-	-	-	-
360	2.428e-01	-	-	-	-	-
370	2.901e-01	-	-	-	-	-
380	2.780e-01	-	-	-	-	-
390	2.770e-01	2.972e-04	-	-	-	-
400	3.859e-01	9.291e-04	-	-	-	-
410	4.429e-01	2.025e-03	-	-	-	-
420	4.455e-01	3.344e-03	1.748e-04	-	-	-
430	4.026e-01	4.739e-03	3.505e-04	-	-	-
440	4.602e-01	8.297e-03	8.276e-04	-	-	-
450	5.047e-01	1.382e-02	1.683e-03	-	-	-
460	5.083e-01	2.025e-02	2.794e-03	-	-	-
470	4.939e-01	2.699e-02	4.203e-03	6.516e-05	-	-
480	4.944e-01	3.469e-02	6.323e-03	1.540e-04	-	-
490	4.659e-01	3.967e-02	8.675e-03	2.909e-04	-	-
500	4.541e-01	4.569e-02	1.176e-02	5.140e-04	-	-
510	4.447e-01	5.171e-02	1.514e-02	8.153e-04	7.069e-05	-
520	4.182e-01	5.475e-02	1.816e-02	1.203e-03	1.303e-04	-
530	4.273e-01	6.107e-02	2.226e-02	1.849e-03	2.313e-04	5.644e-05
540	4.184e-01	6.452e-02	2.546e-02	2.600e-03	3.834e-04	1.060e-04
550	4.143e-01	6.771e-02	2.897e-02	3.487e-03	5.853e-04	1.594e-04
560	3.994e-01	6.783e-02	3.208e-02	4.428e-03	8.461e-04	2.386e-04
570	3.746e-01	6.867e-02	3.365e-02	5.288e-03	1.093e-03	3.070e-04
580	3.671e-01	7.216e-02	3.515e-02	6.068e-03	1.255e-03	3.436e-04
590	3.515e-01	7.103e-02	3.338e-02	5.866e-03	1.083e-03	2.645e-04
600	3.507e-01	6.915e-02	3.036e-02	4.811e-03	6.684e-04	1.295e-04
610	3.446e-01	6.840e-02	2.888e-02	4.506e-03	5.181e-04	8.519e-05
620	3.359e-01	6.688e-02	2.851e-02	4.744e-03	5.111e-04	8.452e-05
630	3.179e-01	6.250e-02	2.743e-02	4.741e-03	4.806e-04	7.113e-05
640	3.269e-01	6.489e-02	2.890e-02	5.022e-03	4.818e-04	6.397e-05
650	3.153e-01	6.238e-02	2.804e-02	4.748e-03	4.287e-04	5.464e-05
660	3.102e-01	5.999e-02	2.639e-02	3.934e-03	3.066e-04	-
670	3.156e-01	6.121e-02	2.660e-02	3.724e-03	2.744e-04	-
680	3.103e-01	6.145e-02	2.628e-02	3.359e-03	2.355e-04	-
690	2.549e-01	4.843e-02	2.051e-02	2.281e-03	1.395e-04	-
700	2.789e-01	4.862e-02	1.867e-02	1.538e-03	5.870e-05	-
710	2.825e-01	4.183e-02	1.328e-02	6.389e-04	-	-
720	2.312e-01	2.416e-02	5.498e-03	1.126e-04	-	-
730	2.316e-01	1.255e-02	1.657e-03	-	-	-
740	2.576e-01	6.359e-03	4.504e-04	-	-	-
750	2.593e-01	4.735e-03	3.153e-04	-	-	-
760	1.598e-01	2.474e-03	1.842e-04	-	-	-
770	2.164e-01	3.047e-03	2.232e-04	-	-	-
780	2.420e-01	3.620e-03	2.576e-04	-	-	-
790	2.270e-01	4.333e-03	3.375e-04	-	-	-
800	2.208e-01	5.715e-03	4.817e-04	-	-	-
810	2.168e-01	6.911e-03	5.856e-04	-	-	-
820	1.723e-01	5.380e-03	3.855e-04	-	-	-
830	1.806e-01	3.228e-03	1.126e-04	-	-	-
840	1.945e-01	1.727e-03	-	-	-	-
850	1.912e-01	1.145e-03	-	-	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	380.00	69.81	28.02	3.82	0.49	0.90
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	312	290	239	295	335	326

Table 12: Station 077.

Wavelength [nm]	Depth [m]	
	2	5
450	8.662e-05	-
460	2.190e-04	-
470	4.060e-04	-
480	6.544e-04	-
490	9.484e-04	-
500	1.405e-03	-
510	2.111e-03	-
520	2.988e-03	-
530	4.284e-03	5.423e-05
540	5.432e-03	9.800e-05
550	6.446e-03	1.717e-04
560	7.009e-03	2.676e-04
570	7.662e-03	3.735e-04
580	8.614e-03	4.964e-04
590	8.820e-03	5.375e-04
600	8.359e-03	4.777e-04
610	8.266e-03	4.816e-04
620	8.481e-03	5.337e-04
630	8.384e-03	5.578e-04
640	9.273e-03	6.391e-04
650	9.392e-03	6.342e-04
660	8.965e-03	5.362e-04
670	9.027e-03	5.040e-04
680	8.925e-03	4.817e-04
690	6.967e-03	3.646e-04
700	6.524e-03	2.919e-04
710	4.446e-03	1.360e-04
720	1.661e-03	-
730	4.355e-04	-
740	1.032e-04	-
750	6.977e-05	-
770	4.794e-05	-
780	5.194e-05	-
790	6.750e-05	-
800	1.072e-04	-
810	1.486e-04	-
820	1.058e-04	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	7.49	0.39
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	127	142



Table 13: Station 083.

Wavelength [nm]	Depth [m]		
	1	2	5
410	4.992e-05	-	-
420	9.774e-05	-	-
430	2.197e-04	-	-
440	6.112e-04	-	-
450	1.493e-03	-	-
460	2.733e-03	-	-
470	4.066e-03	1.278e-04	-
480	5.440e-03	2.200e-04	-
490	6.239e-03	3.322e-04	-
500	7.108e-03	5.111e-04	-
510	8.066e-03	7.724e-04	-
520	9.041e-03	1.084e-03	-
530	1.126e-02	1.565e-03	-
540	1.346e-02	2.088e-03	-
550	1.586e-02	2.745e-03	-
560	1.808e-02	3.577e-03	-
570	1.891e-02	4.226e-03	-
580	2.028e-02	4.849e-03	4.959e-05
590	2.057e-02	4.957e-03	5.401e-05
600	1.978e-02	4.538e-03	4.416e-05
610	1.934e-02	4.369e-03	4.209e-05
620	1.899e-02	4.463e-03	4.779e-05
630	1.794e-02	4.465e-03	5.640e-05
640	1.904e-02	4.988e-03	6.448e-05
650	1.852e-02	5.042e-03	6.725e-05
660	1.756e-02	4.490e-03	5.056e-05
670	1.786e-02	4.174e-03	4.260e-05
680	1.878e-02	4.014e-03	4.440e-05
690	1.551e-02	3.397e-03	-
700	1.582e-02	3.467e-03	-
710	1.247e-02	2.439e-03	-
720	6.506e-03	9.484e-04	-
730	2.948e-03	2.518e-04	-
740	1.291e-03	5.288e-05	-
750	1.014e-03	-	-
760	5.775e-04	-	-
770	8.465e-04	-	-
780	1.327e-03	-	-
790	1.677e-03	-	-
800	2.022e-03	6.935e-05	-
810	2.022e-03	-	-
820	1.277e-03	-	-
830	6.233e-04	-	-
840	3.025e-04	-	-
850	2.038e-04	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	17.78	3.74	0.03
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	193	177	197

Table 14: Station 084.

Wavelength [nm]	Depth [m]	
	1	2
410	6.396e-05	-
420	2.059e-04	-
430	3.963e-04	-
440	9.592e-04	-
450	1.956e-03	-
460	3.104e-03	-
470	4.444e-03	-
480	6.680e-03	9.820e-05
490	8.821e-03	1.707e-04
500	1.058e-02	2.720e-04
510	1.194e-02	4.218e-04
520	1.351e-02	5.988e-04
530	1.749e-02	8.803e-04
540	2.249e-02	1.199e-03
550	2.728e-02	1.648e-03
560	2.740e-02	2.343e-03
570	2.979e-02	2.869e-03
580	3.447e-02	3.339e-03
590	3.649e-02	3.417e-03
600	3.584e-02	3.242e-03
610	3.422e-02	3.253e-03
620	3.337e-02	3.421e-03
630	3.263e-02	3.466e-03
640	3.493e-02	3.819e-03
650	3.507e-02	3.796e-03
660	3.396e-02	3.422e-03
670	3.377e-02	3.269e-03
680	3.289e-02	3.206e-03
690	2.727e-02	2.690e-03
700	2.830e-02	2.635e-03
710	2.432e-02	1.856e-03
720	1.451e-02	7.155e-04
730	7.517e-03	1.947e-04
740	3.756e-03	4.014e-05
750	2.881e-03	-
760	1.519e-03	-
770	2.024e-03	-
780	2.480e-03	-
790	2.750e-03	-
800	3.366e-03	5.015e-05
810	3.985e-03	-
820	3.028e-03	-
830	1.741e-03	-
840	9.504e-04	-
850	6.472e-04	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	30.68	2.70
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	319	183

Table 15: Station 085.

Wavelength [nm]	Depth [m]	
	1	2
440	5.242e-05	-
450	1.344e-04	-
460	2.362e-04	-
470	3.650e-04	-
480	5.028e-04	-
490	6.162e-04	6.965e-05
500	7.510e-04	1.185e-04
510	9.057e-04	1.773e-04
520	1.062e-03	2.462e-04
530	1.281e-03	3.497e-04
540	1.501e-03	4.777e-04
550	1.720e-03	6.266e-04
560	1.911e-03	7.731e-04
570	1.987e-03	8.690e-04
580	2.202e-03	1.023e-03
590	2.306e-03	1.095e-03
600	2.205e-03	1.050e-03
610	2.254e-03	1.088e-03
620	2.350e-03	1.173e-03
630	2.264e-03	1.181e-03
640	2.500e-03	1.349e-03
650	2.508e-03	1.386e-03
660	2.456e-03	1.296e-03
670	2.548e-03	1.267e-03
680	2.671e-03	1.295e-03
690	2.153e-03	1.110e-03
700	2.408e-03	1.201e-03
710	2.078e-03	8.783e-04
720	1.170e-03	3.583e-04
730	5.955e-04	1.077e-04
740	3.013e-04	-
750	2.408e-04	-
760	1.205e-04	-
770	1.461e-04	-
780	1.633e-04	-
790	1.964e-04	-
800	2.518e-04	4.001e-05
810	3.053e-04	-
820	2.328e-04	-
830	1.238e-04	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	2.16	0.97
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	32	57

Table 16: Station 109.

Wavelength [nm]	Depth [m]									
	1	4	9	14	19	24	29	34	39	44
310	8.311e-05	-	-	-	-	-	-	-	-	-
320	9.742e-04	-	-	-	-	-	-	-	-	-
330	3.469e-03	-	-	-	-	-	-	-	-	-
340	5.169e-03	5.543e-04	-	-	-	-	-	-	-	-
350	6.495e-03	1.089e-03	-	-	-	-	-	-	-	-
360	7.319e-03	1.605e-03	-	-	-	-	-	-	-	-
370	9.693e-03	2.632e-03	3.853e-04	-	-	-	-	-	-	-
380	1.004e-02	3.369e-03	6.602e-04	-	-	-	-	-	-	-
390	1.056e-02	4.255e-03	1.072e-03	3.085e-04	-	-	-	-	-	-
400	1.532e-02	7.137e-03	2.252e-03	7.775e-04	2.754e-04	-	-	-	-	-
410	1.838e-02	9.422e-03	3.532e-03	1.379e-03	5.584e-04	1.248e-04	-	-	-	-
420	1.910e-02	1.076e-02	4.659e-03	2.094e-03	9.301e-04	3.021e-04	-	-	-	-
430	1.763e-02	1.083e-02	5.248e-03	2.655e-03	1.306e-03	4.928e-04	1.524e-04	-	-	-
440	2.048e-02	1.350e-02	7.100e-03	3.971e-03	2.159e-03	9.212e-04	3.435e-04	1.182e-04	-	-
450	2.298e-02	1.593e-02	8.951e-03	5.396e-03	3.170e-03	1.517e-03	6.651e-04	2.887e-04	1.434e-04	9.558e-05
460	2.334e-02	1.691e-02	9.987e-03	6.439e-03	4.023e-03	2.143e-03	1.046e-03	5.067e-04	2.787e-04	2.244e-04
470	2.275e-02	1.703e-02	1.045e-02	7.112e-03	4.720e-03	2.708e-03	1.427e-03	7.602e-04	4.528e-04	3.709e-04
480	2.257e-02	1.736e-02	1.096e-02	7.790e-03	5.468e-03	3.329e-03	1.871e-03	1.070e-03	6.772e-04	5.735e-04
490	2.143e-02	1.678e-02	1.075e-02	7.940e-03	5.825e-03	3.726e-03	2.223e-03	1.350e-03	8.956e-04	7.746e-04
500	2.045e-02	1.621e-02	1.033e-02	7.900e-03	5.935e-03	3.903e-03	2.417e-03	1.511e-03	1.028e-03	8.833e-04
510	1.966e-02	1.535e-02	9.416e-03	7.192e-03	5.390e-03	3.520e-03	2.156e-03	1.328e-03	8.935e-04	7.567e-04
520	1.816e-02	1.412e-02	8.410e-03	6.402e-03	4.780e-03	3.119e-03	1.892e-03	1.156e-03	7.731e-04	6.365e-04
530	1.770e-02	1.394e-02	8.221e-03	6.367e-03	4.803e-03	3.169e-03	1.953e-03	1.197e-03	8.101e-04	6.640e-04
540	1.686e-02	1.332e-02	7.694e-03	5.990e-03	4.535e-03	3.007e-03	1.851e-03	1.134e-03	7.606e-04	6.126e-04
550	1.621e-02	1.263e-02	7.051e-03	5.407e-03	4.062e-03	2.657e-03	1.607e-03	9.620e-04	6.288e-04	4.984e-04
560	1.501e-02	1.154e-02	6.255e-03	4.720e-03	3.573e-03	2.295e-03	1.349e-03	7.848e-04	5.028e-04	3.891e-04
570	1.337e-02	9.987e-03	5.182e-03	3.841e-03	2.851e-03	1.781e-03	1.009e-03	5.678e-04	3.551e-04	2.682e-04
580	1.278e-02	8.965e-03	4.182e-03	2.885e-03	2.007e-03	1.150e-03	6.002e-04	3.068e-04	1.718e-04	1.237e-04
590	1.173e-02	7.274e-03	2.765e-03	1.632e-03	9.913e-04	4.724e-04	2.049e-04	8.984e-05	-	-
600	1.043e-02	5.055e-03	1.351e-03	6.072e-04	2.880e-04	1.054e-04	-	-	-	-
610	9.931e-03	4.057e-03	8.439e-04	3.147e-04	1.263e-04	-	-	-	-	-
620	9.695e-03	3.669e-03	6.922e-04	2.415e-04	9.458e-05	-	-	-	-	-
630	8.833e-03	3.138e-03	5.335e-04	1.727e-04	5.995e-05	-	-	-	-	-
640	9.201e-03	3.122e-03	4.601e-04	1.413e-04	4.539e-05	-	-	-	-	-
650	8.695e-03	2.765e-03	3.583e-04	1.009e-04	-	-	-	-	-	-
660	8.262e-03	2.297e-03	2.345e-04	5.271e-05	-	-	-	-	-	-
670	8.291e-03	2.167e-03	1.936e-04	-	-	-	-	-	-	-
680	7.879e-03	1.969e-03	1.477e-04	-	-	-	-	-	-	-
690	5.808e-03	1.239e-03	7.503e-05	-	-	-	-	-	-	-
700	6.033e-03	9.326e-04	-	-	-	-	-	-	-	-
710	5.020e-03	4.541e-04	-	-	-	-	-	-	-	-
720	2.708e-03	9.922e-05	-	-	-	-	-	-	-	-
730	1.382e-03	-	-	-	-	-	-	-	-	-
740	7.021e-04	-	-	-	-	-	-	-	-	-
750	5.353e-04	-	-	-	-	-	-	-	-	-
760	2.650e-04	-	-	-	-	-	-	-	-	-
770	3.206e-04	-	-	-	-	-	-	-	-	-
780	3.705e-04	-	-	-	-	-	-	-	-	-
790	4.244e-04	-	-	-	-	-	-	-	-	-
800	5.441e-04	-	-	-	-	-	-	-	-	-
810	6.485e-04	-	-	-	-	-	-	-	-	-
820	4.867e-04	-	-	-	-	-	-	-	-	-
830	2.983e-04	-	-	-	-	-	-	-	-	-
840	1.596e-04	-	-	-	-	-	-	-	-	-
850	1.246e-04	-	-	-	-	-	-	-	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	19.58	12.18	6.16	4.17	2.87	1.72	0.98	0.56	0.36	0.29
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	29	33	33	41	49	59	59	60	69	81

Table 17: Station 123.

Wavelength [nm]	Depth [m]			
	Surface	1	4	9
300	5.544e-04	-	-	-
310	1.507e-02	-	-	-
320	7.762e-02	-	-	-
330	1.724e-01	6.311e-04	-	-
340	2.035e-01	1.235e-03	-	-
350	2.297e-01	2.158e-03	-	-
360	2.438e-01	2.987e-03	-	-
370	3.098e-01	4.853e-03	-	-
380	3.137e-01	6.794e-03	-	-
390	3.287e-01	9.617e-03	-	-
400	4.793e-01	1.771e-02	-	-
410	5.720e-01	2.524e-02	-	-
420	5.953e-01	3.056e-02	1.728e-04	-
430	5.573e-01	3.350e-02	2.837e-04	-
440	6.594e-01	4.598e-02	5.056e-04	-
450	7.517e-01	6.048e-02	8.662e-04	-
460	7.830e-01	7.066e-02	1.249e-03	-
470	7.831e-01	7.810e-02	1.662e-03	-
480	8.094e-01	8.808e-02	2.210e-03	-
490	7.866e-01	9.000e-02	2.705e-03	-
500	7.846e-01	9.505e-02	3.286e-03	4.143e-05
510	7.869e-01	1.041e-01	3.852e-03	5.988e-05
520	7.559e-01	1.064e-01	4.296e-03	8.472e-05
530	7.806e-01	1.147e-01	5.199e-03	1.291e-04
540	7.737e-01	1.191e-01	5.905e-03	1.726e-04
550	7.736e-01	1.227e-01	6.551e-03	2.173e-04
560	7.487e-01	1.262e-01	6.949e-03	2.527e-04
570	7.063e-01	1.212e-01	6.894e-03	2.794e-04
580	7.004e-01	1.150e-01	6.565e-03	2.573e-04
590	6.794e-01	1.100e-01	5.322e-03	1.750e-04
600	6.808e-01	9.897e-02	3.662e-03	8.363e-05
610	6.761e-01	9.342e-02	2.906e-03	4.343e-05
620	6.639e-01	9.021e-02	2.673e-03	-
630	6.299e-01	8.323e-02	2.366e-03	-
640	6.609e-01	8.613e-02	2.309e-03	-
650	6.443e-01	8.350e-02	2.046e-03	-
660	6.439e-01	7.853e-02	1.614e-03	-
670	6.648e-01	7.679e-02	1.451e-03	-
680	6.629e-01	7.462e-02	1.329e-03	-
690	5.333e-01	5.629e-02	9.123e-04	-
700	5.938e-01	5.629e-02	6.468e-04	-
710	6.011e-01	4.475e-02	2.828e-04	-
720	4.809e-01	2.108e-02	5.447e-05	-
730	4.817e-01	9.057e-03	-	-
740	5.413e-01	3.651e-03	-	-
750	5.454e-01	2.857e-03	-	-
760	3.333e-01	1.631e-03	-	-
770	4.509e-01	2.184e-03	-	-
780	5.158e-01	2.586e-03	-	-
790	4.902e-01	3.093e-03	-	-
800	4.848e-01	4.128e-03	-	-
810	4.752e-01	4.869e-03	-	-
820	3.596e-01	3.522e-03	-	-
830	3.784e-01	1.665e-03	-	-
840	4.072e-01	6.729e-04	-	-
850	3.985e-01	4.160e-04	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	684.94	118.04	4.05	0.08
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	530	609	293	380

Table 18: Station 124.

Wavelength [nm]	Depth [m]		
	1	2	4
310	7.480e-05	-	-
320	7.741e-04	-	-
330	2.470e-03	-	-
340	4.197e-03	3.528e-04	-
350	6.670e-03	9.358e-04	-
360	9.087e-03	1.484e-03	-
370	1.418e-02	2.581e-03	-
380	1.752e-02	3.673e-03	1.840e-04
390	2.196e-02	5.264e-03	3.687e-04
400	3.717e-02	1.001e-02	8.995e-04
410	4.943e-02	1.469e-02	1.600e-03
420	5.710e-02	1.890e-02	2.479e-03
430	5.824e-02	2.151e-02	3.302e-03
440	7.348e-02	3.022e-02	5.300e-03
450	8.776e-02	4.021e-02	7.923e-03
460	9.513e-02	4.682e-02	1.030e-02
470	9.984e-02	5.099e-02	1.238e-02
480	1.069e-01	5.619e-02	1.503e-02
490	1.063e-01	5.728e-02	1.679e-02
500	1.096e-01	5.951e-02	1.888e-02
510	1.124e-01	6.117e-02	2.053e-02
520	1.098e-01	6.039e-02	2.137e-02
530	1.157e-01	6.523e-02	2.410e-02
540	1.158e-01	6.720e-02	2.542e-02
550	1.163e-01	6.892e-02	2.618e-02
560	1.130e-01	6.871e-02	2.608e-02
570	1.080e-01	6.599e-02	2.503e-02
580	1.058e-01	6.340e-02	2.338e-02
590	9.746e-02	5.570e-02	1.890e-02
600	8.773e-02	4.562e-02	1.307e-02
610	8.217e-02	4.004e-02	1.036e-02
620	7.882e-02	3.747e-02	9.435e-03
630	7.302e-02	3.408e-02	8.315e-03
640	7.391e-02	3.386e-02	7.955e-03
650	7.024e-02	3.130e-02	7.001e-03
660	6.595e-02	2.753e-02	5.501e-03
670	6.501e-02	2.640e-02	4.946e-03
680	6.262e-02	2.511e-02	4.473e-03
690	4.936e-02	1.899e-02	3.096e-03
700	4.852e-02	1.673e-02	2.191e-03
710	3.953e-02	1.103e-02	9.767e-04
720	2.188e-02	4.192e-03	1.973e-04
730	1.077e-02	1.108e-03	-
740	5.069e-03	2.612e-04	-
750	4.009e-03	1.825e-04	-
760	2.185e-03	1.120e-04	-
770	2.787e-03	1.303e-04	-
780	3.242e-03	1.232e-04	-
790	3.798e-03	1.616e-04	-
800	4.822e-03	2.475e-04	-
810	5.524e-03	3.352e-04	-
820	4.050e-03	2.509e-04	-
830	2.139e-03	-	-
840	1.025e-03	-	-
850	6.672e-04	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	118.43	59.77	17.44
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	286	278	286

Table 19: Station C.

Wavelength [nm]	Depth [m]			
	Surface	1	2	5
300	1.167e-04	-	-	-
310	4.699e-03	-	-	-
320	2.908e-02	-	-	-
330	6.792e-02	5.445e-04	-	-
340	7.851e-02	7.487e-04	-	-
350	8.414e-02	9.847e-04	-	-
360	8.503e-02	1.579e-03	-	-
370	1.033e-01	3.043e-03	-	-
380	1.005e-01	4.421e-03	1.600e-04	-
390	1.017e-01	5.807e-03	2.728e-04	-
400	1.432e-01	9.251e-03	5.770e-04	-
410	1.662e-01	1.126e-02	9.656e-04	-
420	1.697e-01	1.316e-02	1.465e-03	-
430	1.557e-01	1.521e-02	1.909e-03	-
440	1.797e-01	2.213e-02	2.996e-03	-
450	1.999e-01	2.783e-02	4.269e-03	-
460	2.034e-01	3.069e-02	5.323e-03	8.505e-05
470	1.989e-01	3.176e-02	6.271e-03	1.437e-04
480	2.010e-01	3.355e-02	7.538e-03	1.901e-04
490	1.915e-01	3.273e-02	8.400e-03	2.358e-04
500	1.875e-01	3.324e-02	9.326e-03	2.969e-04
510	1.852e-01	3.435e-02	1.012e-02	3.546e-04
520	1.760e-01	3.481e-02	1.035e-02	4.045e-04
530	1.797e-01	3.876e-02	1.122e-02	5.113e-04
540	1.766e-01	4.110e-02	1.154e-02	5.991e-04
550	1.750e-01	4.297e-02	1.184e-02	6.795e-04
560	1.684e-01	4.205e-02	1.183e-02	7.424e-04
570	1.577e-01	3.935e-02	1.179e-02	7.679e-04
580	1.562e-01	3.795e-02	1.214e-02	7.639e-04
590	1.499e-01	3.442e-02	1.133e-02	6.259e-04
600	1.495e-01	3.094e-02	9.828e-03	4.285e-04
610	1.488e-01	2.866e-02	8.830e-03	3.478e-04
620	1.469e-01	2.758e-02	8.159e-03	3.330e-04
630	1.399e-01	2.625e-02	7.145e-03	2.967e-04
640	1.462e-01	2.845e-02	6.978e-03	2.806e-04
650	1.415e-01	2.841e-02	6.457e-03	2.301e-04
660	1.412e-01	2.774e-02	5.950e-03	1.624e-04
670	1.450e-01	2.840e-02	6.150e-03	1.383e-04
680	1.440e-01	2.655e-02	6.285e-03	1.281e-04
690	1.181e-01	1.896e-02	4.671e-03	8.982e-05
700	1.305e-01	1.772e-02	4.033e-03	6.196e-05
710	1.338e-01	1.430e-02	2.633e-03	-
720	1.081e-01	8.209e-03	9.799e-04	-
730	1.095e-01	4.835e-03	2.792e-04	-
740	1.241e-01	3.100e-03	7.135e-05	-
750	1.258e-01	2.864e-03	4.495e-05	-
760	7.653e-02	1.502e-03	-	-
770	1.050e-01	1.661e-03	-	-
780	1.177e-01	1.870e-03	-	-
790	1.112e-01	2.367e-03	4.551e-05	-
800	1.093e-01	3.049e-03	7.202e-05	-
810	1.075e-01	3.421e-03	-	-
820	8.315e-02	2.456e-03	-	-
830	8.785e-02	1.511e-03	-	-
840	9.621e-02	8.920e-04	-	-
850	9.537e-02	6.968e-04	-	-
PAR [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	160.45	41.01	10.52	0.42
Deck irradiance [ $\mu\text{Ein m}^{-2}\text{s}^{-1}$ ]	130	129	133	105

