

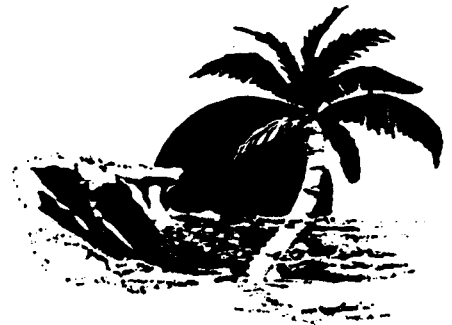
UFL/COEL-93/002

**TURBIDITY DATA:
HOLLYWOOD BEACH, FLORIDA, JANUARY 1990 to APRIL 1992.**

by

**P. E. Dompe
and
D. M. Hanes**

May 1, 1993



COASTAL & OCEANOGRAPHIC ENGINEERING DEPARTMENT

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Sponsored by:

**Sea Grant College Program
National Oceanographic and Atmospheric Administration**

and

**Coastal Sciences Program
U.S. Office of Naval Research**

**Coastal and Oceanographic Engineering Department
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TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
I	INTRODUCTION	2
II	METHODOLOGY	4
III	CALIBRATION OF INSTRUMENTATION	5
IV	QUALITY CONTROL	7
V	DATA SUMMARY	10
VI	ACKNOWLEDGMENTS	14
VII	REFERENCES	14
 <u>APPENDIX</u>		
	TURBIDITY DATA TIME SERIES	15

Turbidity Data: Hollywood Beach, Florida January 1990 to April 1992

I. INTRODUCTION

The Department of Coastal and Oceanographic Engineering at the University of Florida has collected field measurements of turbidity from January 1990 to April 1992 at two nearshore locations off the coast of Hollywood Beach, Florida. This report contains descriptions of the methods used to collect and analyze the data, as well as summaries of the data collected.

Hollywood Beach is located on the southeast coast of Florida (Figure 1) within an area restricted by the State of Florida's standards for class three waters. This area was part of a 8.5 km beach re-nourishment project, which began in April 1991 and was completed in August of the same year. The measurements to be presented in this report were obtained at two sites normal to the shoreline centered within the re-nourishment project in water depths of approximately 10 m (Site 1) and 5 m (Site 2). Site 1, located at 26° 00.5' north longitude and 80° 06' west latitude, is approximately 1 km due east of Site 2. Site 1 is located in a sandy region near a shore-parallel reef system. Site 2 is in a uniformly sandy region about 370 meters from the shoreline.

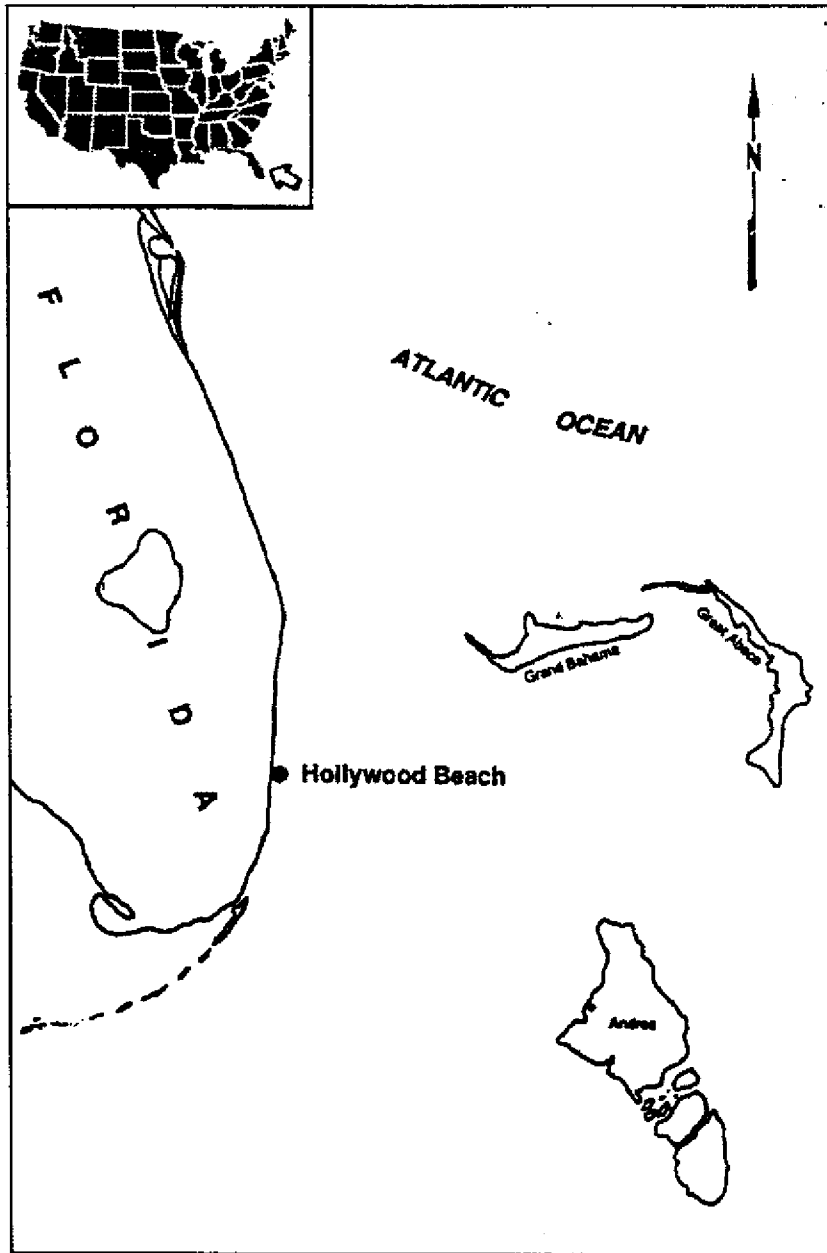


Figure 1: Location of Hollywood and Hallandale.

In this report we quantify turbidity in Nephelometric Turbidity Units (NTU). Although the word "turbid" is a qualitative term referring to a suspension of particles in a fluid, "turbidity" has evolved into a quantitative term which is related to the light scattering characteristics of the suspension mixture. The units or measure of turbidity, however, do not indicate the nature of the particles responsible for the light scattering. In

the data to be presented, we believe there are at least two distinct size classes of particles causing turbidity. The very fine sediments and organic particulate which remain suspended approximately uniformly in the water column are one source of turbidity. Sand sized sediments which are locally resuspended by waves and currents near the seabed are the other main source of turbidity. The turbidities due to resuspended sand are sometimes extremely high (100 or more NTU), but the region of such high turbidity in this data set is generally restricted to order 10 cm above the seabed.

II. METHODOLOGY

Instrumentation at each site consists of two Downing and Associates model OBS-1C's optical backscatterance sensors (OBS) and an Onset Computer Corporation model Tattletale 6 data logger. Also present are a Transmetrics model P21 pressure transducer, and a Marsh McBirney model 521 dual axis electromagnetic current meter, from which the wave climate is derived. The wave and current data are described in a separate report (Dompe and Hanes, 1992). The instruments are mounted on a goal post type system within the bottom 2 meters of the water column (Fig. 2). The goal post system reduces scour in order to minimize the hydrodynamic influences upon turbidity induced by the experimental setup. Turbidity sensors are generally mounted within one meter above the seabed. The data logger controls the sampling strategy, converts the analog signal to digital, and records the data. The logger can process eight analog signals through a 12 bit analog-to-digital converter with a storage capacity of 20 megabytes. Sampling is achieved through in-situ burst measurements at a rate that will both utilize the logger's storage capacity over a month and record significant events. Significant events include fluctuations in turbidity over all periods ranging from a few seconds to several days. This is achieved by burst sampling data every 4 hours for thirty minutes at 4 hertz frequency, producing 184 records per month per site, with 7166 measurements for each instrument per record.

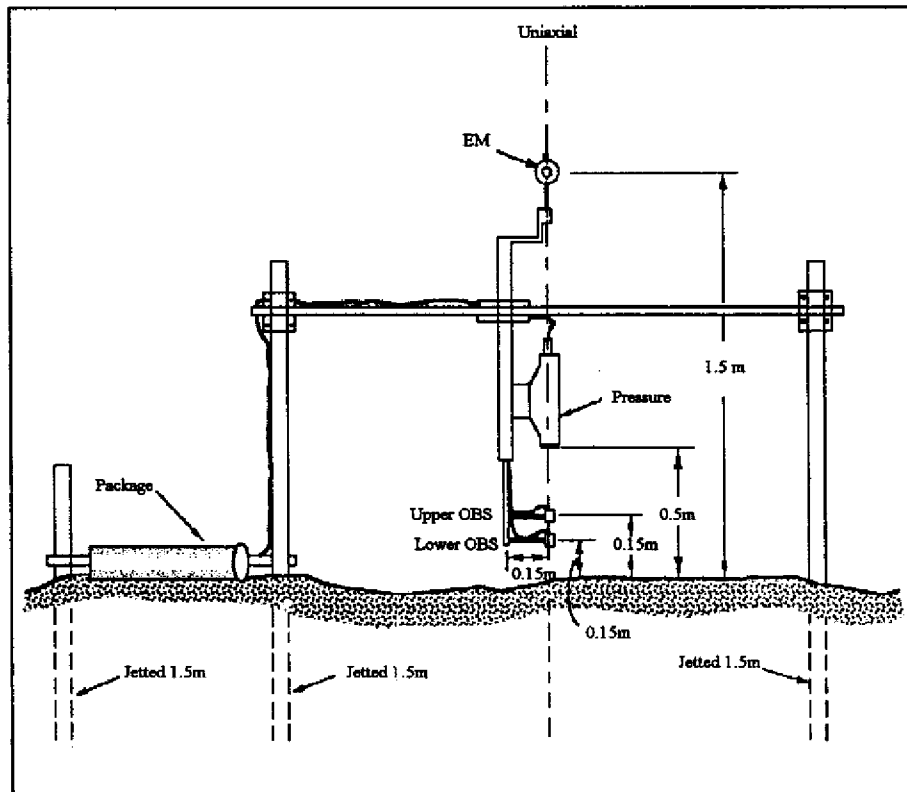


Figure 2: Schematic view of the instrumentation array.

III. CALIBRATION of INSTRUMENTATION

The OBS sensors measure turbidity by detecting infrared radiation (IR) scattered by particles suspended in the water column. Since 98% of the solar infrared radiation passing through 20 centimeters of clear water is attenuated, the OBS sensors can operate at depths greater than 20 centimeters without significant degradation of the signal to noise ratio from ambient sun light. These instruments are linear from 0 to 1,500 NTU with a threshold of 1 NTU. The OBS has an adjustable gain and offset. The gain of each sensor is adjusted to match the range of turbidity expected in the field and the input span of the data logger. Generally the sensor is initially set with a small positive offset. With these settings, the lower and upper sensors typically saturate at approximately 400 NTU and 75 NTU respectively.

Calibration of the OBS is accomplished in the laboratory using Formazin standard as the turbidity agent, a Hach portable turbidimeter as the reference, and a 5 gallon black bucket filled with tap water at room temperature. The procedure progresses as follows: First, the OBS are mounted vertically in the bucket so the beam radiates across the diameter at least 5 centimeters from both the surface and the bottom. Next, turbidity is recorded in NTU using the portable turbidimeter, and the output of the OBS is recorded in volts by the data logger. This last step is repeated over a range of turbidity similar to that expected during deployment. The results are analyzed using regression analysis resulting in calibration curves with regression coefficients near unity (Figure 3). This process provides calibration constants (gain and offset) for each sensor which allow for the conversion of volts into NTU's.

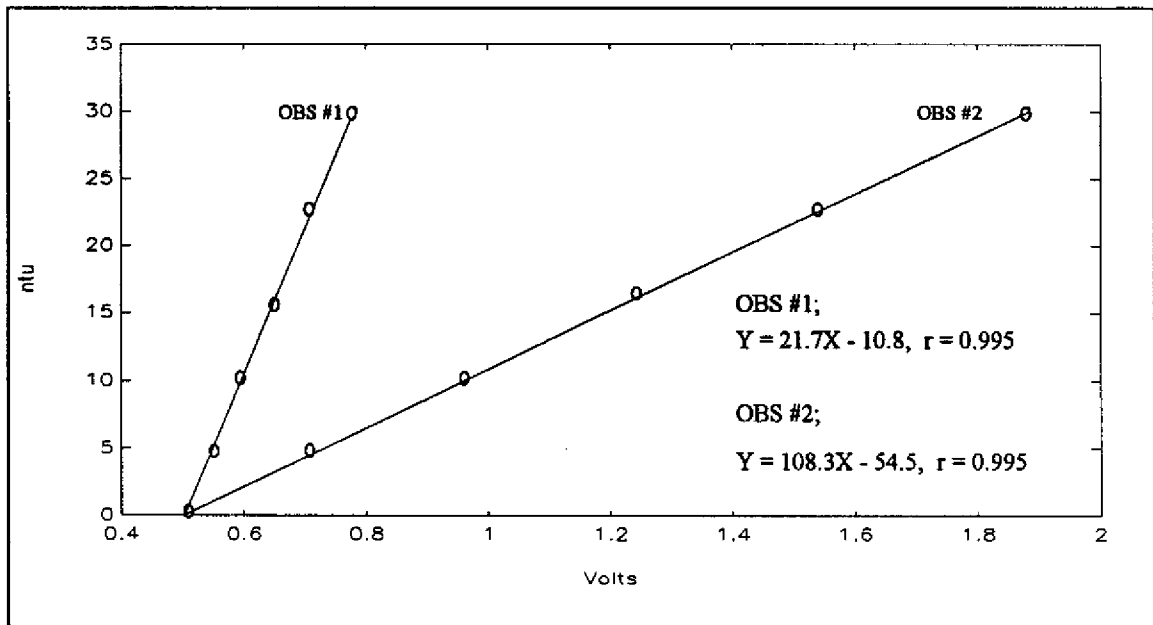


Figure 3: OBS calibration curve.

Application of the calibration constants to convert field measurements into NTU's is straight forward with the exception of an occasional discrepancy in the offset. Occasionally the OBS offset in the field (verified using a portable turbidimeter) differs from the laboratory offset. In these cases the field offsets are adopted for calibration.

Field offsets are measured three times: during installation, at cleaning (approximately in the middle of a deployment), and during recovery. The result is two calibration curves applied to the raw data (varying only by the offset), first from the deployment to the cleaning, and second from the cleaning to the recovery of the instruments. Typically variations in the offset are less than 5 NTU.

IV. QUALITY CONTROL

Turbidity data collected using the OBS can contain erroneous data such as that produced by biofouling or instrument failure. Biofouling consists of the growth of algae and barnacles on the sensor as well as fish swimming within the sensor's sample volume. Instrument failures include battery interruptions, improper adjustment of the offset, and complete failure of the instrument. Quality control analysis is an effort to tag observations which have been biased and rate the investigator's confidence in each observation. This is accomplished through examination of the calibrated time series and monthly summaries. Quality of each observation is rated as either "good", "reduced accuracy," or "bad." For example, Figure 4 shows the time series of a run categorized as data of "good" data. Figure 5, in contrast shows "bad" data for the turbidity signal at the 0.85 meter elevation. In this case the biofouling has elevated the signal to the point of saturation. The effect of biofouling on the signal can also be observed on the monthly summary plots as illustrated in Figure 6 where the signal after Julian day 220 increases in an exponential manner until the instrument is cleaned on Julian day 224. Typically data is considered "bad" when biofouling is obvious as in the case above or for instances of instrument failure.

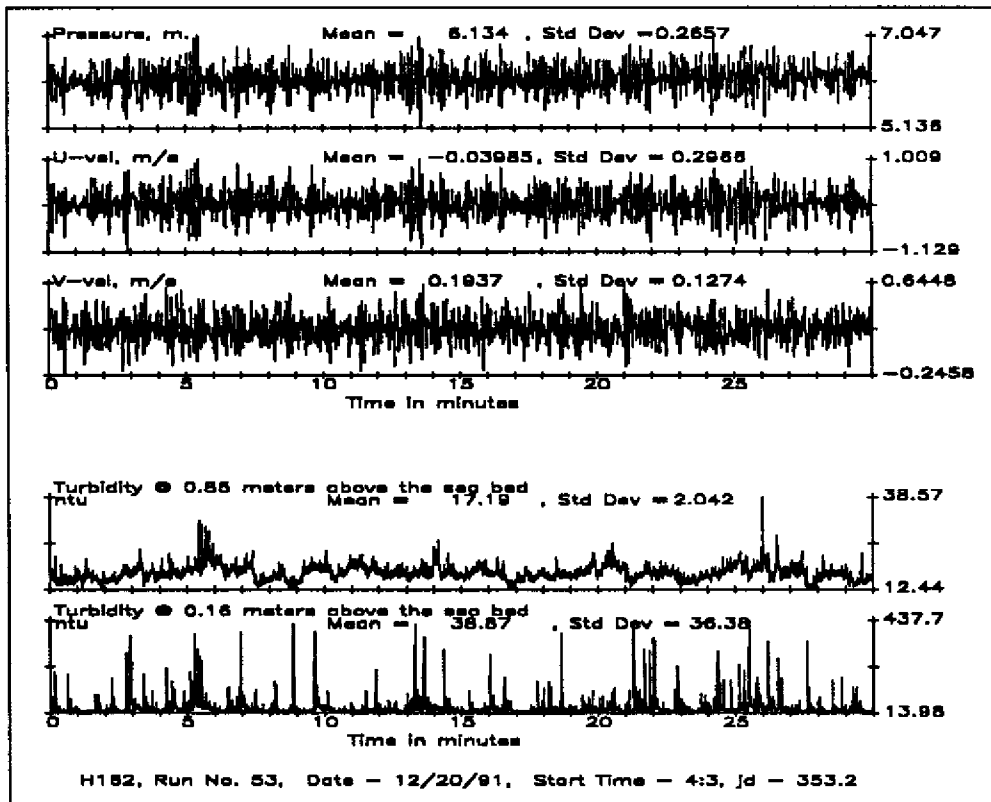


Figure 4: Thirty minute time series from deployment 16 site 2 illustrating "good" data.

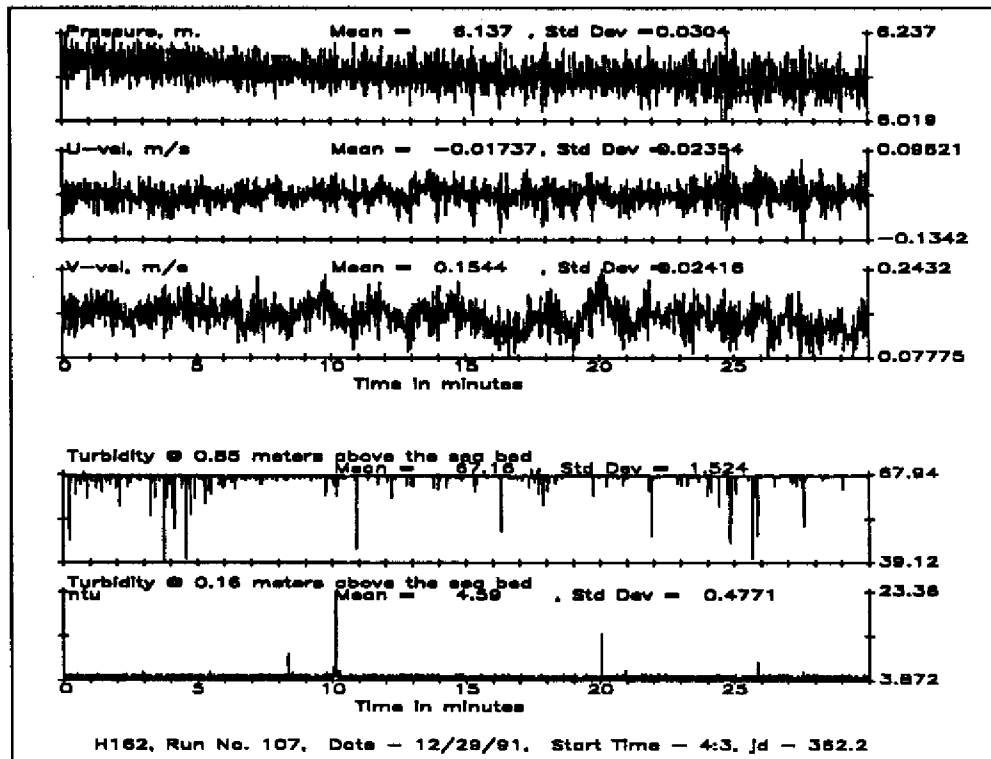


Figure 5: Thirty minute time series from deployment 16 site 2 illustrating "bad" data for the upper OBS.

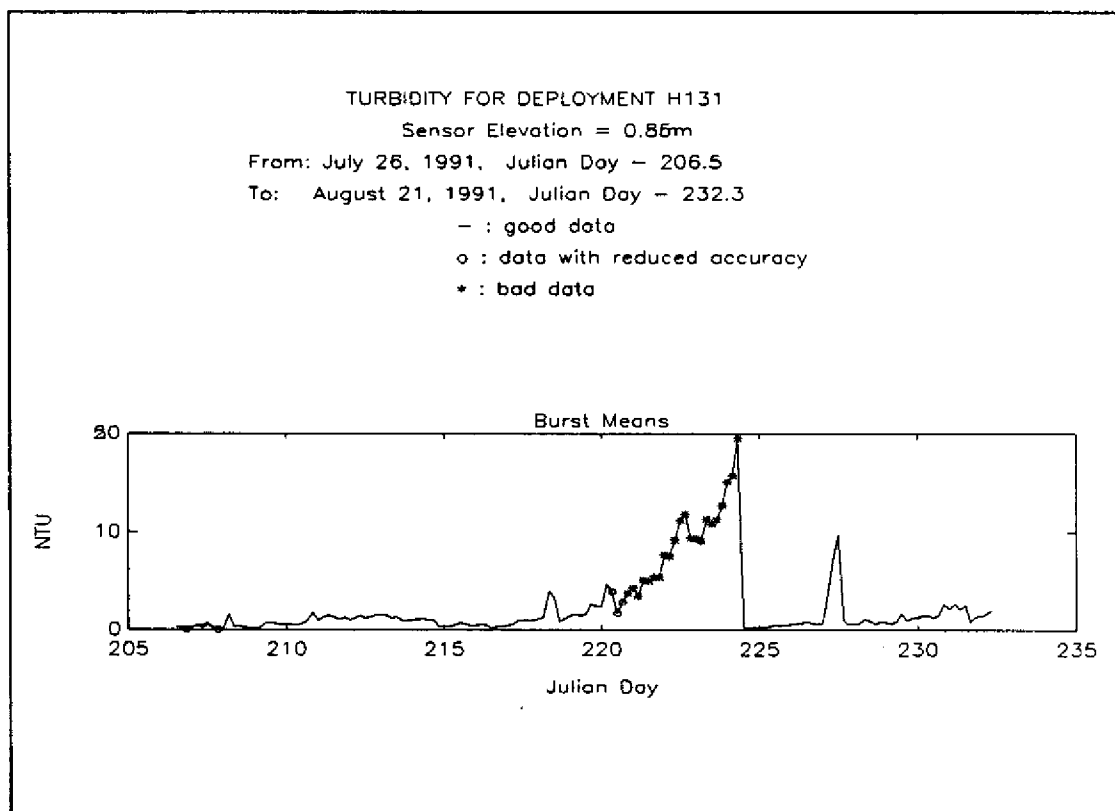


Figure 6: Summary plot of deployment 13 site 1 illustrating the long term effect of biofouling beginning on Julian day 220 and increasing until the instrument was cleaned on Julian day 224.

Quality of the data is considered to be of "reduced accuracy" if the signal exhibits small abnormalities or in cases of partial data loss. For example, in Figure 7 the signal is partially missing due to a shift in the offset below the threshold input of the data logger. Figure 8 shows an example of an abnormality, which although small, reduces the investigator's confidence in the observation to that of "reduced accuracy."

Figure 9 is a listing of each instrument's operational status over the monitoring period. Operational status is based on the deployment schedule and the quality rating of the data from the instrument. Although "bad" quality of the turbidity data is usually due to biofouling, there were also instances of instrument failure. Fifty-one percent of the data recorded by the OBS sensors was labeled as "good" or "reduced accuracy" data.

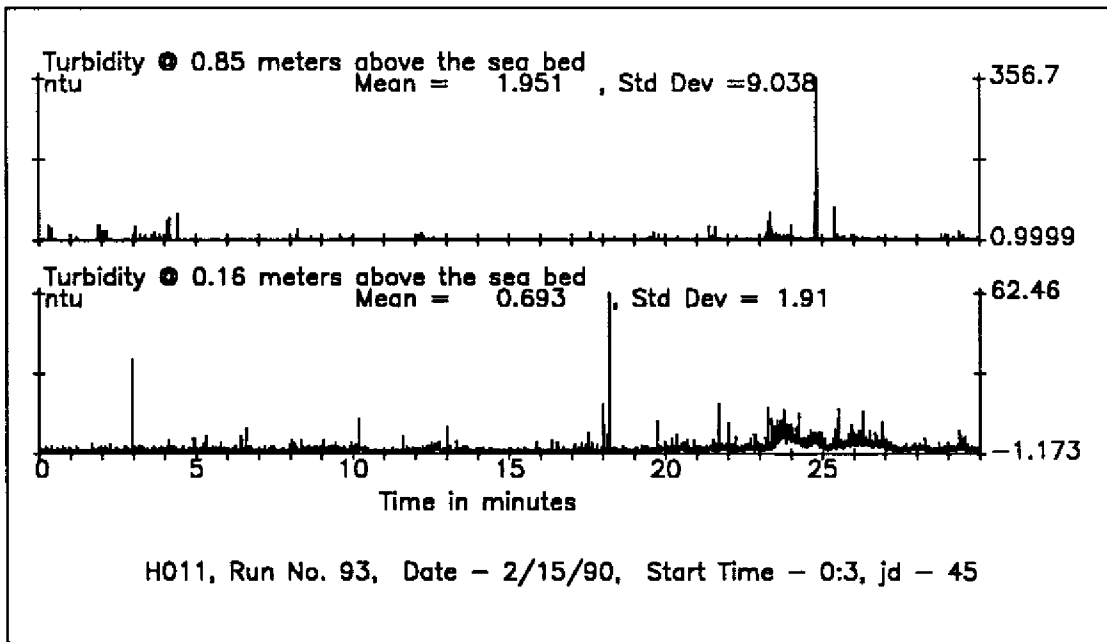


Figure 7: Thirty minute time series from deployment 13 site 1 illustrating, for the lower turbidity sensor, an observation categorized as data with "reduced accuracy."

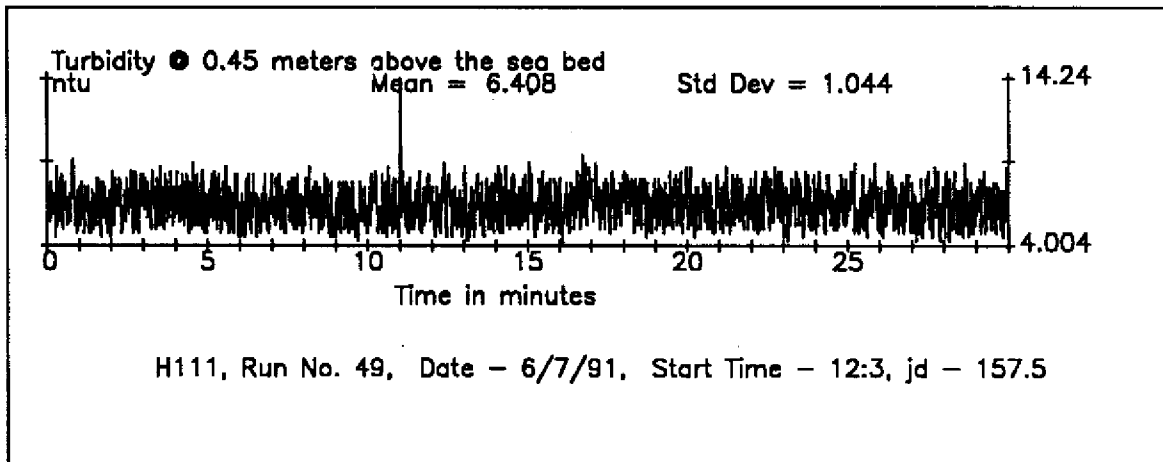


Figure 8: Thirty minute time series from deployment 11 site 1 illustrating an observation categorized as data with "reduced accuracy".

V. DATA SUMMARY

The overall data set can be summarized by considering the statistics of the mean of each turbidity record. In other words the 7166 values in each 30 minute record can be averaged to yield one turbidity value. Then the statistics of these mean values can be

examined. Excluding observations composed of "bad" data, this process results in summaries for each month in Table 1 and Table 2, or for the entire deployment in Table 3. In Tables 1 through 4 the data is divided into two categories according to the elevation of the OBS sensor. The lower elevation includes all observations between 0 and 0.5 meters above the sea bed, and the upper elevation includes observations between 0.5 and 0.85 meters above the sea bed.

Time series of burst averaged turbidity data are also presented in the Appendix. These plots are labeled with the actual elevation of the sensor during the respective deployment. Also included in the Appendix are reference tables describing the investigator's opinion of the data, noted events, and descriptions of any abnormal signals for each deployment summary plot. Labeling of the figures in the Appendix is determined using the following convention; *Habc* signifies deployment number *ab* at site *c*. Each point on a plot represents the thirty minute burst mean of the data. A line represents high quality data, circles represent data with reduced accuracy, and stars represent bad data.

Fluctuations in turbidity are sometimes correlated with wave height. For comparison purposes, the wave measurements from Hollywood which are described in Dompe and Hanes, 1992, are summarized in Tables 4 and 5.

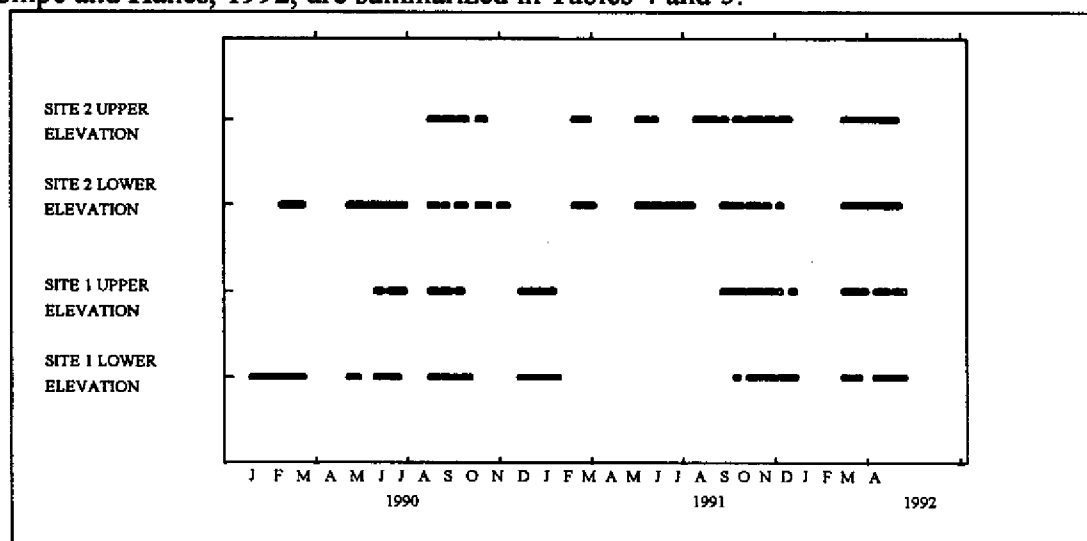


Figure 9: Data availability.

YR	Month	TURBIDITY: 0.0 to 0.5 METERS ABOVE THE SEA BED (NTU)					TURBIDITY: 0.5 to 0.85 METERS ABOVE THE SEA BED (NTU)				
		MEAN	STD	MAX	MIN	# of REC	MEAN	STD	MAX	MIN	# of REC
90	JAN	1.5	0.4	2.0	1.0	5	N/A	N/A	N/A	N/A	N/A
90	FEB	4.7	8.0	46.7	0.0	293	N/A	N/A	N/A	N/A	N/A
90	MAR	8.0	12.0	85.5	0.0	164	N/A	N/A	N/A	N/A	N/A
90	APR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	MAY	4.6	1.8	13.8	2.5	52	N/A	N/A	N/A	N/A	N/A
90	JUN	1.9	0.8	4.8	0.0	93	2.4	1.0	5.0	0.6	36
90	JUL	2.3	2.0	10.7	0.6	48	2.5	2.1	9.6	0.6	87
90	AUG	2.6	0.8	3.9	0.6	44	8.7	5.9	19.0	0.2	44
90	SEP	1.4	0.8	3.4	0.3	81	1.9	1.3	4.6	0.0	25
90	OCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	NOV	5.1	4.2	20.1	0.3	41	4.0	2.4	12.6	0.9	31
90	DEC	12.0	11.1	78.5	3.7	99	8.6	3.2	16.7	4.7	42
91	JAN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	MAR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	APR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	JUN	N/A	N/A	N/A	N/A	N/A	2.5	2.2	10.4	1.2	16
91	JUL	1.8	1.2	4.7	0.0	40	2.3	3.7	32.4	0.0	148
91	AUG	2.9	2.3	16.3	0.6	143	3.3	3.4	24.5	0.4	100
91	SEP	7.0	3.8	22.2	1.8	45	6.4	3.7	12.8	2.2	16
91	OCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	NOV	3.0	4.8	22.6	0.0	93	3.0	3.8	18.2	0.2	107
91	DEC	4.1	3.7	20.4	1.0	95	4.2	4.9	21.4	0.9	77
92	JAN	3.0	1.9	4.4	0.1	7	3.4	1.2	5.7	0.2	20
92	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
92	MAR	9.7	0.2	9.8	9.5	2	4.5	5.0	25.9	2.1	21
92	APR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 1: Monthly turbidity measurements, site 1

YR	Month	TURBIDITY: 0.0 to 0.5 METERS ABOVE THE SEA BED (ntu)					TURBIDITY: 0.5 to 0.85 METERS ABOVE THE SEA BED (ntu)				
		MEAN	STD	MAX	MIN	# of REC	MEAN	STD	MAX	MIN	# of REC
90	JAN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	MAR	14.3	17.7	114.7	2.3	250	N/A	N/A	N/A	N/A	N/A
90	APR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	MAY	15.9	18.1	127.5	2.7	131	N/A	N/A	N/A	N/A	N/A
90	JUN	4.1	4.2	34.0	0.0	267	N/A	N/A	N/A	N/A	N/A
90	JUL	1.9	2.0	13.7	0.0	180	N/A	N/A	N/A	N/A	N/A
90	AUG	5.5	2.4	9.4	1.0	26	3.0	2.3	12.1	0.0	39
90	SEP	6.9	9.2	49.8	0.8	25	2.4	3.0	22.9	0.7	59
90	OCT	30.3	45.9	222.4	0.2	52	25.2	29.3	97.8	0.8	23
90	NOV	34.2	27.2	102.9	4.0	13	N/A	N/A	N/A	N/A	N/A
90	DEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	JAN	9.0	7.3	43.4	0.7	63	9.4	7.3	36.9	0.7	68
91	FEB	45.5	15.4	95.4	31.3	18	N/A	N/A	N/A	N/A	N/A
91	MAR	19.3	14.2	50.3	8.5	25	10.1	5.8	23.0	2.2	24
91	APR	25.2	26.4	165.8	0.8	96	24.5	12.6	55.9	8.7	40
91	MAY	43.2	58.5	259.4	0.6	116	2.6	0.6	3.3	1.4	11
91	JUN	5.0	2.5	9.7	1.0	16	13.8	8.8	52.6	0.0	127
91	JUL	30.1	30.2	213.4	0.5	134	3.6	2.7	17.0	0.0	66
91	AUG	11.3	13.4	89.1	0.6	48	6.6	7.8	53.6	0.3	118
91	SEP	N/A	N/A	N/A	N/A	N/A	9.7	3.8	25.7	5.1	39
91	OCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	NOV	21.8	20.0	106.6	0.0	160	13.8	10.0	53.1	0.0	169
91	DEC	16.3	19.8	82.2	0.0	183	15.3	11.9	42.5	0.0	164
92	JAN	7.8	3.8	19.2	0.0	24	N/A	N/A	N/A	N/A	N/A
92	FEB	3.1	2.7	16.2	0.8	66	1.8	1.8	9.5	0.2	47
92	MAR	1.8	0.4	2.0	1.3	3	5.2	7.7	40.0	0.8	71
92	APR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
92	MAY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 2: Monthly turbidity measurements, site 2.

YR	MO	SIGNIFICANT WAVE HEIGHT (meters)				PEAK WAVE PERIOD (seconds)				PEAK WAVE DIRECTION (theta)				# of PTS
		MEAN	STD	MAX	MIN	MEAN	STD	MAX	MIN	MEAN	STD	MAX	MIN	
90	JAN	0.38	0.20	0.61	0.26	3.6	0.5	4.2	3.2	106	33	131	68	3
90	FEB	0.74	0.42	1.80	0.11	5.0	1.6	10.2	3.2	95	38	167	6	168
90	MAR	0.76	0.41	2.31	0.16	5.4	1.7	11.1	3.2	89	33	161	11	157
90	APR	0.23	0.06	0.37	0.13	5.3	2.2	8.8	3.2	49	0	49	49	26
90	MAY	0.42	0.34	1.55	0.11	4.0	0.8	6.6	3.1	123	22.2	152	68	51
90	JUN	0.26	0.14	0.71	0.12	3.9	1.5	13.4	3.2	118	40	146	49	93
90	JUL	0.34	0.21	0.83	0.12	3.8	0.8	8.8	3.2	105	32	161	38	87
90	AUG	0.26	0.18	0.75	0.10	3.6	0.6	5.4	3.2	138	19	161	114	96
90	SEP	0.27	0.12	0.74	0.11	3.4	0.7	11.1	3.2	N/A	N/A	N/A	N/A	4
90	OCT	1.2	0.56	3.01	0.55	3.3	0.0	3.4	3.2	N/A	N/A	N/A	N/A	27
90	NOV	0.65	0.41	1.76	0.15	5.6	2.5	12.2	3.2	72	31	131	8	47
90	DEC	0.64	0.38	1.43	0.13	5.1	2.1	11.1	3.2	70	31	133	6	124
91	JAN	0.63	0.14	0.83	0.38	4.2	0.6	5.0	3.2	94	36	135	49	12
91	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	MAR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	APR	0.44	0.20	0.97	0.18	3.9	0.5	5.0	3.2	115	27	148	62	28
91	MAY	0.48	0.27	1.11	0.11	4.1	0.7	5.9	3.2	96	27	133	41	122
91	JUN	0.27	0.19	1.06	0.11	4.6	2.6	13.4	3.2	58	24	156	36	173
91	JUL	0.24	0.13	0.72	0.10	3.7	0.9	8.2	3.2	134	36	176	81	175
91	AUG	0.24	0.14	0.85	0.09	4.3	1.7	10.2	3.2	80	47	161	8	143
91	SEP	0.29	0.17	0.87	0.10	5.4	2.6	12.2	3.2	59	33	176	28	126
91	OCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	NOV	0.71	0.40	1.76	0.12	6.0	2.7	13.4	3.2	73	30	148	13	147
91	DEC	0.60	0.49	2.21	0.10	5.1	1.8	9.5	3.2	70	31	133	6	134
92	JAN	0.51	0.29	1.40	0.12	6.6	2.6	12.2	3.2	68	33	139	30	132
92	FEB	0.71	0.21	1.15	0.36	7.2	2.6	10.2	3.2	70	45	150	30	27
92	MAR	0.41	0.31	1.69	0.10	5.7	2.2	10.2	3.2	72	42	144	28	55
92	APR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
92	MAY	0.50	0.27	0.82	0.11	5.1	2.0	10.2	3.2	54	29	133	26	21

Table 3: Monthly wave measurements, site 1

YR	MNTH	SIGNIFICANT WAVE HEIGHT (meters)				PEAK WAVE PERIOD (seconds)				PEAK WAVE DIRECTION (theta)				# of PTS
		MEAN	STD	MAX	MIN	MEAN	STD	MAX	MIN	MEAN	STD	MAX	MIN	
90	JAN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	MAR	0.67	0.31	1.79	0.21	5.0	1.7	11.1	2.3	82	34	174	4	159
90	APR	0.27	0.05	0.38	0.18	3.1	1.5	7.3	2.3	114	78	178	2	24
90	MAY	0.44	0.30	1.30	0.10	3.9	1.1	6.6	2.3	120	15	148	84	87
90	JUN	0.32	0.16	0.79	0.09	3.9	2.0	12.2	2.3	96	32	139	36	179
90	JUL	0.36	0.20	0.78	0.11	3.7	1.0	8.2	2.4	105	29	170	38	90
90	AUG	0.25	0.14	0.69	0.10	3.1	0.8	5.4	2.4	N/A	N/A	N/A	N/A	74
90	SEP	0.30	0.12	0.69	0.11	3.7	2.0	12.2	2.4	N/A	N/A	N/A	N/A	106
90	OCT	0.63	0.40	1.86	0.10	5.2	2.4	15.0	2.5	N/A	N/A	N/A	N/A	108
90	NOV	0.73	0.44	1.46	0.20	5.5	1.3	7.3	2.6	N/A	N/A	N/A	N/A	28
90	DEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	JAN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	FEB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	MAR	0.74	0.30	1.34	0.17	4.2	0.9	5.9	2.5	124	16	150	79	33
91	APR	0.64	0.37	1.64	0.12	4.4	1.3	8.2	2.4	98	30	159	15	174
91	MAY	0.58	0.35	1.80	0.13	4.1	1.1	7.3	2.3	98	24	140	32	161
91	JUN	0.34	0.22	1.08	0.11	3.8	2.1	15.0	2.5	80	36	167	30	162
91	JUL	0.28	0.13	0.70	0.12	3.3	1.1	8.8	2.3	97	26	141	45	174
91	AUG	0.27	0.12	0.73	0.13	3.6	1.6	9.5	2.3	87	38	141	32	171
91	SEP	0.30	0.14	0.73	0.13	4.8	2.7	11.1	2.4	57	36	161	11	126
91	OCT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
91	NOV	0.68	0.32	1.56	0.13	6.0	2.7	17.0	2.4	66	30	144	13	146
91	DEC	0.56	0.34	1.79	0.13	4.9	1.9	12.2	2.4	73	35	148	6	167
92	JAN	0.38	0.17	0.80	0.18	8.2	3.5	13.4	2.4	37	25	103	0	38
92	FEB	0.38	0.17	0.90	0.12	5.6	3.2	13.4	2.0	83	44	154	15	123
92	MAR	0.90	0.35	1.99	0.47	2.9	1.1	9.5	2.5	N/A	N/A	N/A	N/A	81
92	APR	0.90	0.51	1.63	0.23	4.6	3.5	13.4	2.4	N/A	N/A	N/A	N/A	20
92	MAY	0.40	0.21	0.85	0.13	4.6	2.5	12.2	2.3	N/A	N/A	N/A	N/A	125

Table 4: Monthly wave measurements, site 2

PARAMETER	MEAN (NTU)	MEDIAN (NTU)	MODE (NTU)	STANDARD DEVIATION (NTU)	MAXIMUM (NTU)	MINIMUM (NTU)	# OF PTS
TURBIDITY, SITE 1 LOWER ELEVATION	4.7	2.4	0.9	7.2	85.5	0.0	1345
TURBIDITY, SITE 1 UPPER ELEVATION	3.7	2.4	1.0	4.0	32.4	0.0	782
TURBIDITY, SITE 2 LOWER ELEVATION	16.0	7.0	2.0	25.7	259.4	0.0	1896
TURBIDITY, SITE 2 UPPER ELEVATION	10.5	6.6	1.4	11.0	97.8	0.0	1065

Table 5: Overall statistics

VI. ACKNOWLEDGEMENTS

This report was developed under the auspices of the Florida Sea Grant College Program with support from the National Oceanic and Atmospheric Administration, Office of Sea Grant, U. S. Department of Commerce, Grant No. R/C-S-30. Partial funding of this project was also provided by the Coastal Sciences Program, U.S. Office of Naval Research. We also wish to thank Broward County Office of Natural Resources Protection for their assistance and support in kind and the Coastal and Oceanographic laboratory staff at the University of Florida for their assistance.

VII. REFERENCES

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APPENDIX
TURBIDITY DATA TIME SERIES

DEPLOYMENT	DATE	OBS SENSOR ELEVATION (METERS)	COMMENTS
H011	1/31/90 to 3/2/90	0.1	Most of the data is considered to be of "reduced accuracy" as a result of a partial data loss. A shift in the offset during the deployment below the input threshold of the data logger resulted in partial loss of the signal. There are several turbidity events that corresponding to storm wave events over the deployment.
H011	1/31/90 to 3/2/90	0.3	The quality is generally "good" with the exception of some suspected fouling near the end. There are several turbidity events that corresponding to storm wave events over the deployment.
H021	3/6/90 to 4/5/90	0.2	Quality is initially "good". However the signal begins to degrade at approximately Julian day 67 due to biofouling. The event at the beginning of the deployment is highly correlated to storm waves.
H021	3/6/90 to 4/5/90	0.4	A shift in the offset occurred after Julian day 67 below the input threshold of the data logger resulting in partial loss of the signal and hence the "reduced accuracy" quality rating. Eventually biofouling reduces the signal to a quality rating of "bad data". Again like the lower sensor the event at the beginning of the deployment is highly correlated to storm waves.
H022	3/5/90 to 5/5/90	0.2	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 85. There are several turbidity events that corresponding to storm wave events over the deployment.
H022	3/5/90 to 5/5/90	0.3	Same as the lower sensor.
H031	5/17/90 to 5/26/90	0.3	Quality is good until the instruments abruptly failed after Julian day 145.
H032	5/17/90 to 6/15/90	0.1	Quality of the data is good throughout the deployment with the exception of a few points with reduced accuracy.
H032	5/17/90 to 6/15/90	0.2	The signal is similar to that of the lower sensor with good quality until the instrument was incapacitated on Julian day 144.
H041	6/15/90 to 7/15/90	0.3	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 189.
H041	6/15/90 to 7/15/90	0.6	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 171 to Julian day 182 at which point the sensors were cleaned.
H042	6/15/90 to 7/16/90	0.2	Generally good data, except for a small disturbance near Julian day 172 at which point the signal appeared to have some biological interference.
H042	6/15/90 to 7/16/90	0.5	Quality of the data is good throughout the deployment with the exception of a few points of reduced accuracy.
H051	8/13/90 to 9/28/90	0.1	There are 3 specific sections labeled as "bad" data. First, a power interruption from Julian day 229 to 236 rendered much of the turbidity data over this time period "bad". Also growth fouled the signal just prior to the cleaning on Julian day 254, and again just prior to the recovery.
H051	8/13/90 to 9/28/90	0.8	Same as the lower sensor.
H052	8/13/90 to 9/28/90	0.1	Biofouling and power failures resulted in only a small amount of good data for this deployment.
H052	8/13/90 to 9/28/90	0.8	Biofouling and power failures resulted in only a small amount of good data for this deployment.
H062	10/5/90 to 11/8/90	0.1	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 287 and again just prior to recovery. The turbidity event that from Julian day 280 to 285 corresponds to storm wave events.

H062	10/5/90 to 11/8/90	0.8	Although the data is initially of good quality, the instrument failed at the peak of the turbidity event.
H071	11/19/90 to 1/8/91	0.3	This data set contains some small abnormalities in the signal as well as growth near the end resulting in reduced accuracy.
H071	11/19/90 to 1/8/91	0.85	This data set also contains some small abnormalities in the signal mostly due to saturation of the signal particularly near the end as biofouling increased.
H072	11/19/90 to 12/18/90	0.1	Although there is a good correlation between wave height and turbidity, the signal contained abnormalities, therefore data is tagged as reduced accuracy.
H072	11/19/90 to 12/18/90	0.8	Same as the above sensor.
H082	1/17/91 to 2/18/91	0.1	This set is comprised of some good data. However a large portion of the data has been effected by biofouling.
H082	1/17/91 to 2/18/91	0.8	This data set appears to have been effected immediately by growth, and therefore is basically "bad" data.
H092	3/26/91 to 4/25/91	0.1	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 100. There are several turbidity events that corresponding to storm wave events over the deployment.
H092	3/26/91 to 4/25/91	0.75	Similar to the lower sensor except the interference due to the biofouling eventually saturates this sensor.
H101	4/26/91 to 5/19/91	0.6	Generally good data, except for a small disturbance near Julian day 132 at which point the signal appeared to have some biological interference.
H102	4/26/91 to 5/26/91	0.1	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 132 to Julian day 135 at which point the sensors were cleaned. There are several turbidity events that corresponding to storm wave events over the deployment.
H111	5/30/91 to 6/27/91	0.5	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 170 to the recovery.
H112	5/30/91 to 6/25/91	0.8	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 170 to the recovery.
H121	6/28/91 to 7/24/91	0.5	Growth during this deployment reduced the data set to only a limited number of points immediately following the cleaning on Julian day 192.5.
H121	6/28/91 to 7/24/91	0.85	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 190 to Julian day 192 at which point the sensors were cleaned, and then again after Julian day 200 to the recovery.
H122	6/28/91 to 7/24/91	0.1	This data set contains some small abnormalities in the signal as well as growth near the end resulting in reduced accuracy.
H122	6/28/91 to 7/24/91	0.7	Due to the biofouling which occurred almost immediately and until the cleaning at Julian day 192 the first part of the deployment is reduced accuracy. Also the data quality at the end is bad due to biofouling.
H131	7/26/91 to 8/21/91	0.5	Quality of the data is good throughout the deployment with the exception of a few points of reduced accuracy.
H131	7/26/91 to 8/21/91	0.85	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 220 to Julian day 224 at which point the sensors were cleaned.
H132	7/26/91 to 8/26/91	0.13	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 212 to Julian day 224 at which point the sensors were cleaned, and then again after Julian day 227 to the recovery.
H132	7/26/91 to 8/26/91	0.8	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 216 to Julian day 224 at which point the sensors were cleaned. The offset drops below zero 227 for an unknown reason. From this point on the data is considered to have "reduced accuracy", which reduces to "bad" quality as biofouling eventually interferes with the signal.

H141	8/28/91 to 9/22/91	0.85	Due to the high rate of biofouling only the first observation and a few runs after the cleaning are considered good.
H141	8/28/91 to 9/22/91	0.5	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 247 to Julian day 252 at which point the sensors were cleaned, and then again after Julian day 255 to the recovery.
H142	8/28/91 to 9/22/91	0.1	Growth during this deployment reduced the good data set to only a limited number of points at the beginning of the deployment.
H142	8/28/91 to 9/22/91	0.8	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 325 to the recovery.
H151	11/6/91 to 12/2/91	0.5	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 325 to the recovery. There are several turbidity events that corresponding to storm wave events over the deployment.
H151	11/6/91 to 12/2/91	0.85	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 325 to 328 at which point the interference appears to have been removed (it's possible some debris got caught on the sensor and fell off caused the interference) therefore from this point to the recovery the quality ranges from "reduced accuracy" to "bad". There are several turbidity events that corresponding to storm wave events over the deployment.
H152	11/6/91 to 12/7/91	0.1	Quality of the data is good throughout the deployment with the exception of a few points of reduced accuracy. There are several turbidity events that corresponding to storm wave events over the deployment.
H152	11/6/91 to 12/7/91	0.8	Same as the above sensor.
H161	12/11/91 to 1/6/92	0.5	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 360 to the recovery. There was no cleaning for this deployment. Turbidity events demonstrate a correlation to storm wave events over the deployment.
H161	12/11/91 to 1/6/92	0.85	Same as the above sensor.
H162	12/11/91 to 1/7/92	0.2	Quality of the data is good with the exception of some biofouling near the end of the deployment. Turbidity events demonstrate a correlation to storm wave events over the deployment.
H162	12/11/91 to 1/7/92	0.85	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 355 to the recovery. There was no cleaning for this deployment. Turbidity events demonstrate a correlation to storm wave events over the deployment.
H177	1/9/92 to 2/6/92	N/A	There is no Turbidity data for this deployment.
H182	2/7/92 to 2/27/92	0.1	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 47 to the recovery. There was no cleaning for this deployment. Turbidity events demonstrate a correlation to storm wave events over the deployment.
H182	2/7/92 to 2/27/92	0.8	Similar to the above sensor.
H191	3/12/92 to 4/10/92	0.5	Only a few good points at the beginning of the deployment. Intermittent failure of the data loggers hard drive resulted in several lost observations.
H191	3/12/92 to 4/10/92	0.8	Similar to the above sensor.
H192	3/12/92 to 4/10/92	0.15	Although there is a good correlation between wave height and turbidity, the signal contained abnormalities perceived as bad, therefore all but the first few observations are tagged as "bad" data.
H192	3/12/92 to 4/10/92	0.84	Quality of the data is good until biofouling begins to interfere with the signal near Julian Day 85 to the recovery. There was no cleaning for this deployment. Turbidity events demonstrate a correlation to storm wave events over the deployment.

TURBIDITY FOR DEPLOYMENT H011

Sensor Elevation = 0.1m

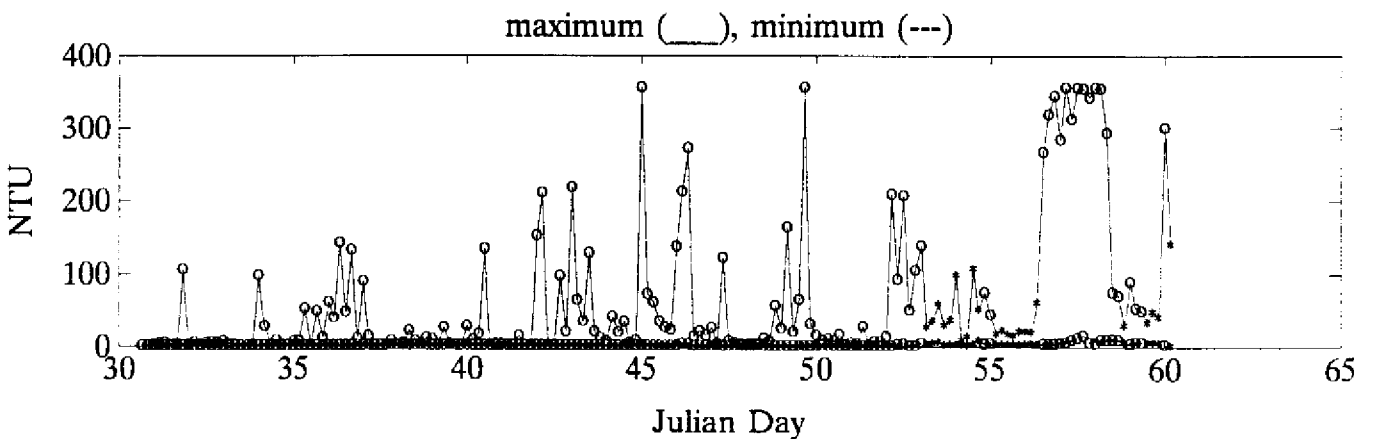
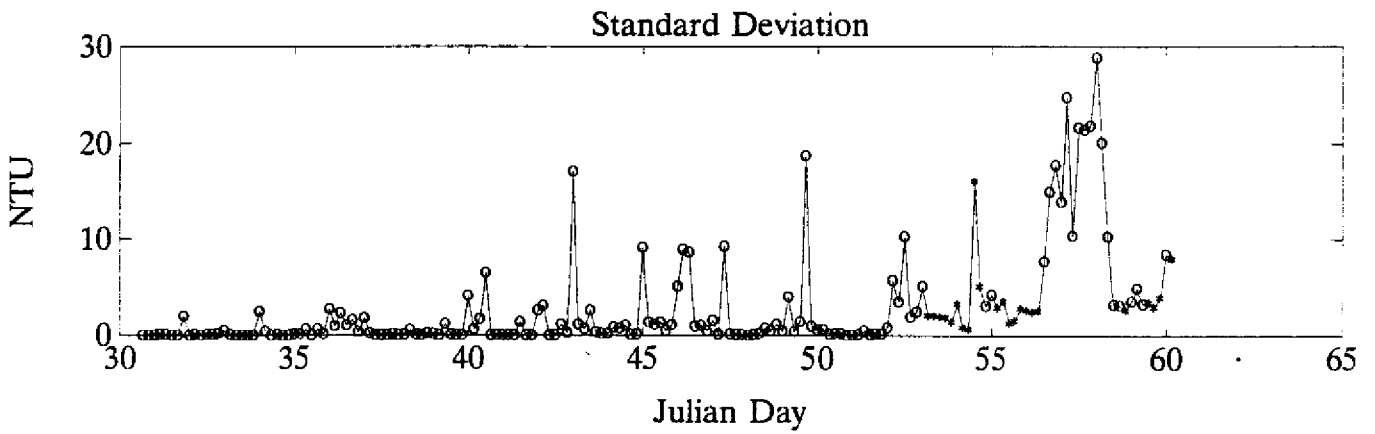
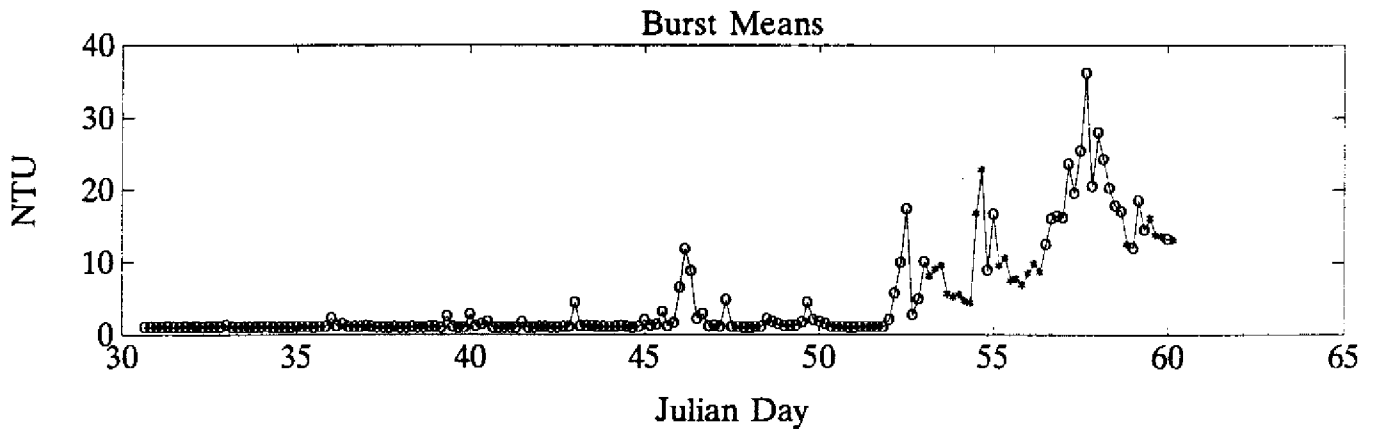
From: January 31, 1990, Julian Day - 30.66

To: March 2, 1990, Julian Day - 60.16

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H011

Sensor Elevation = 0.3m

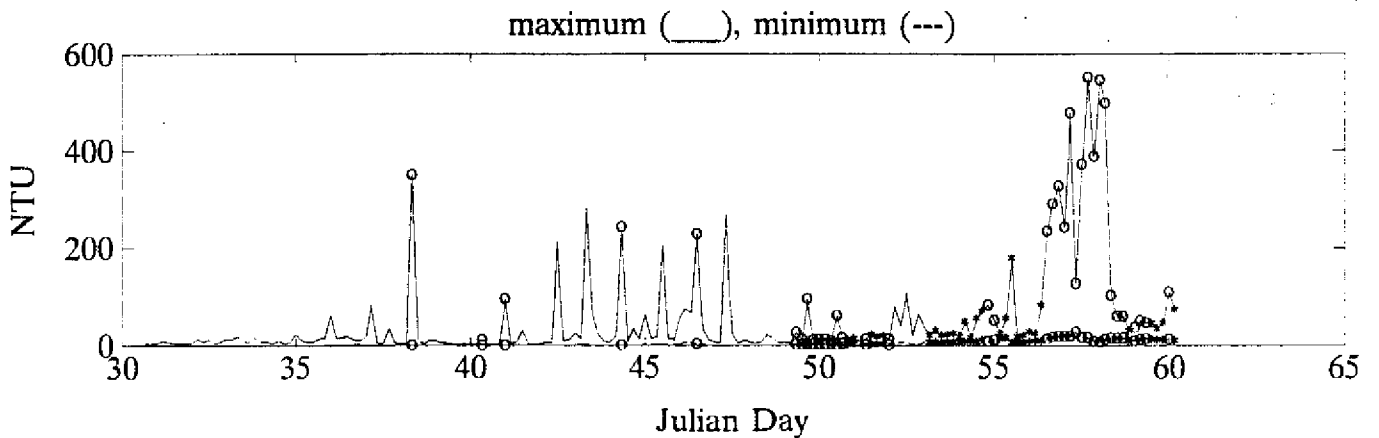
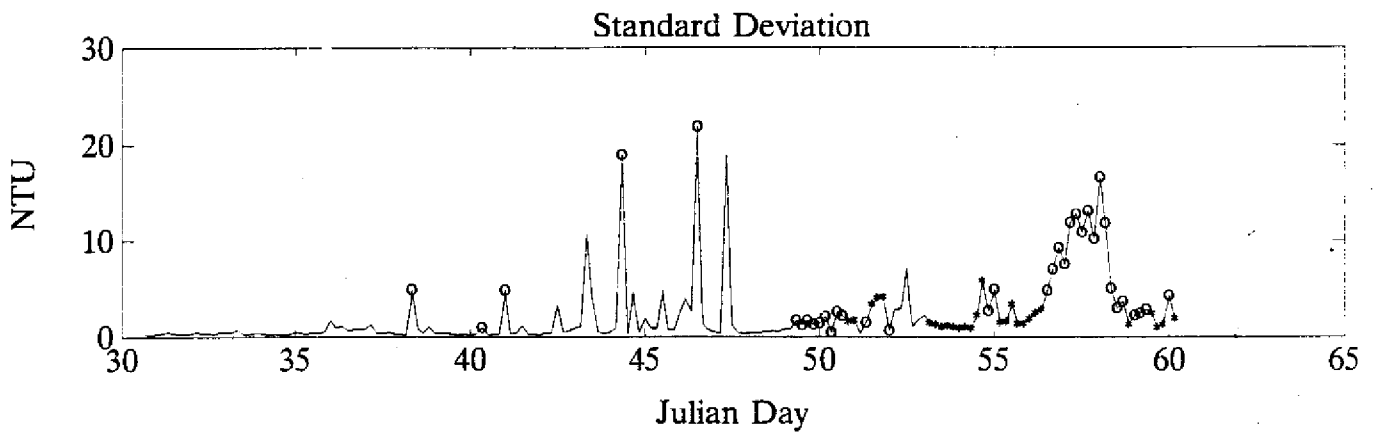
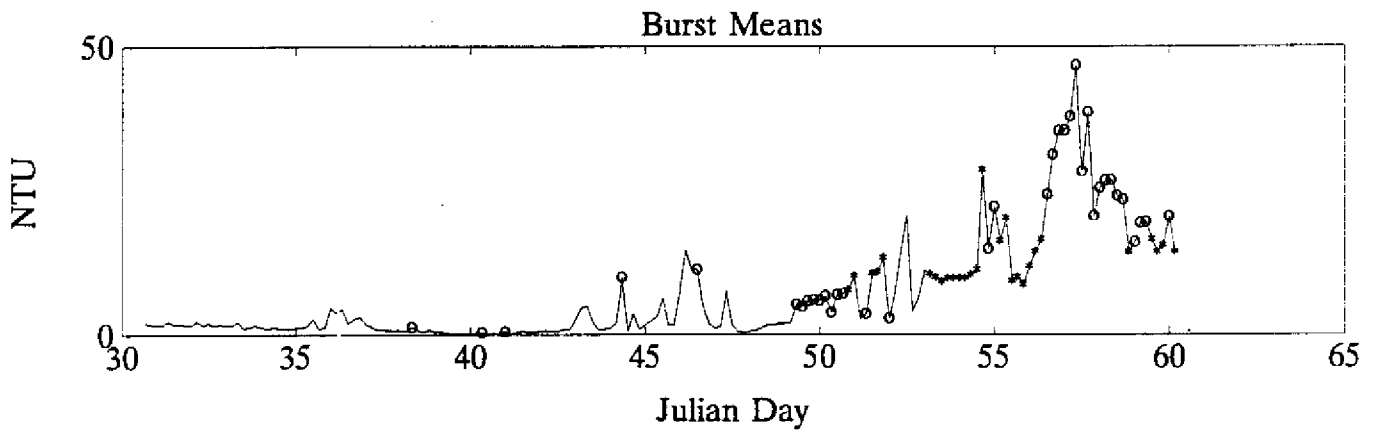
From: January 31, 1990, Julian Day - 30.66

To: March 2, 1990, Julian Day - 60.16

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H021

Sensor Elevation = 0.2m

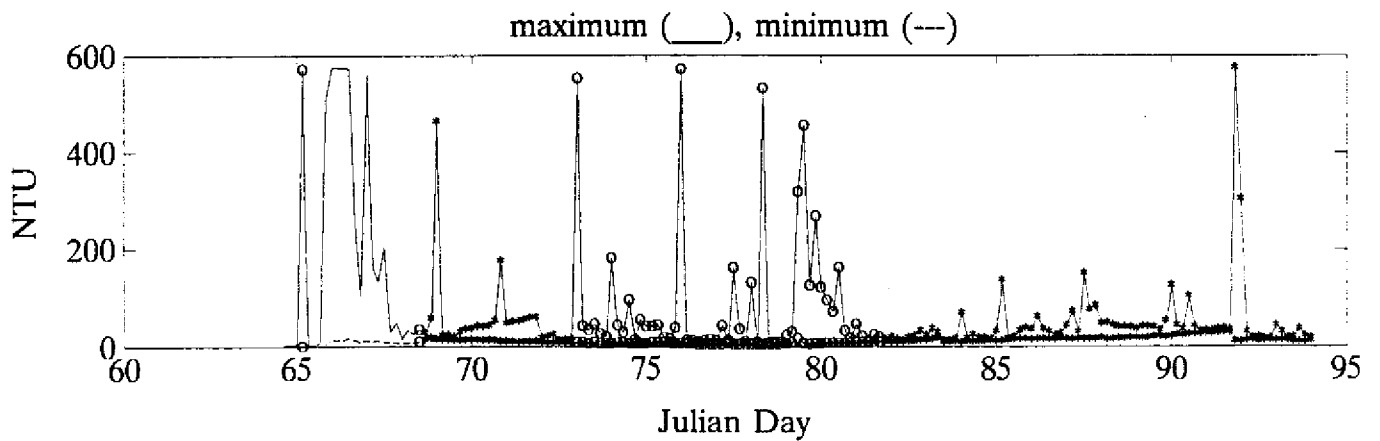
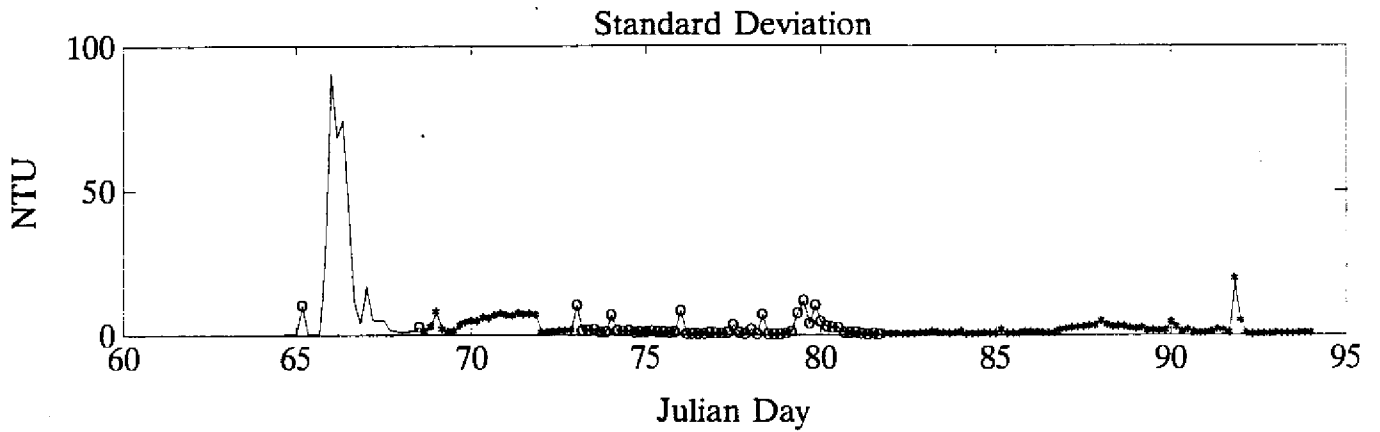
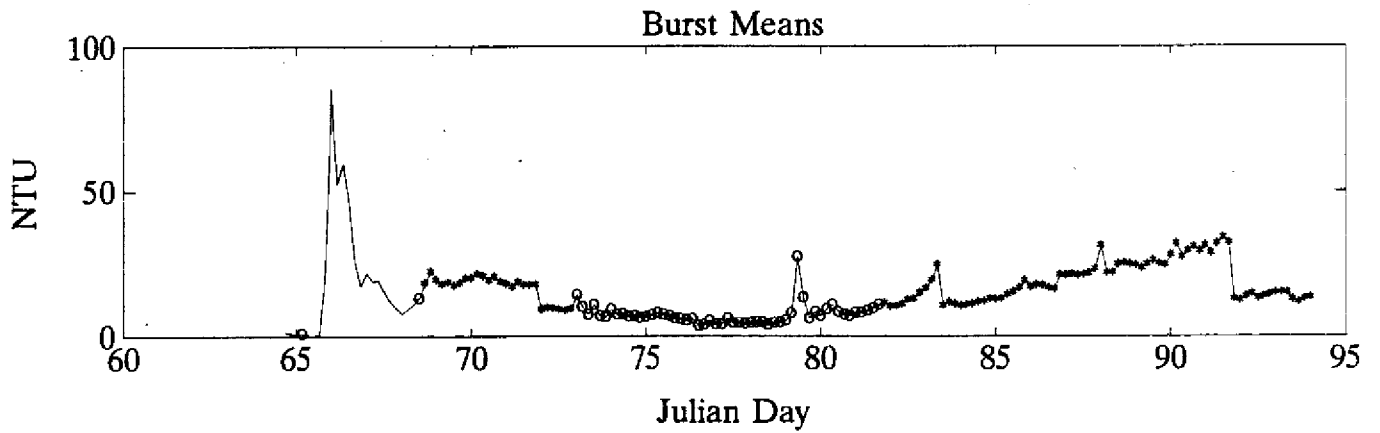
From: March 6, 1990, Julian Day - 64.67

To: April 5, 1990, Julian Day - 94.16

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H021

Sensor Elevation = 0.4m

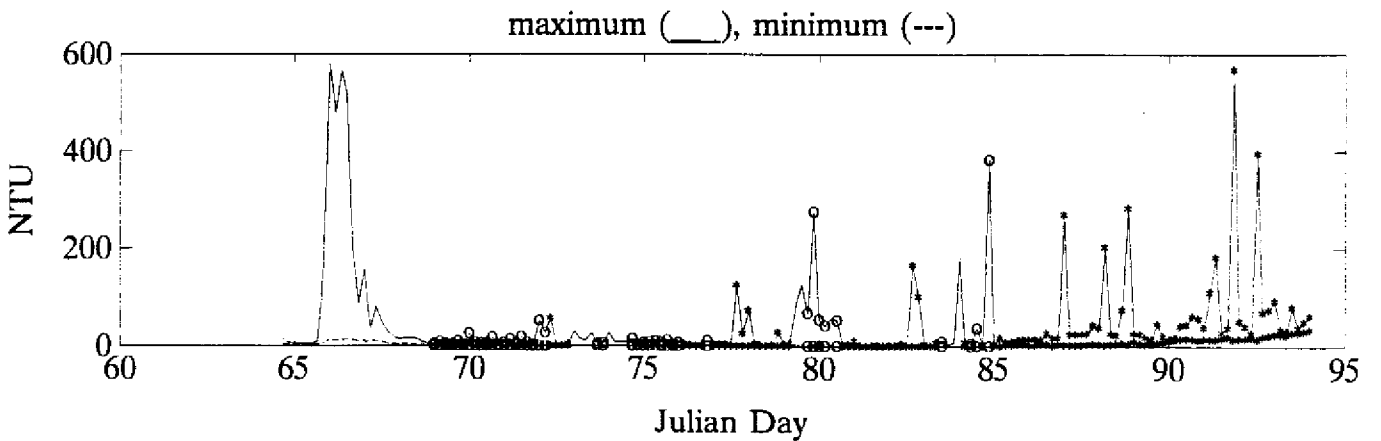
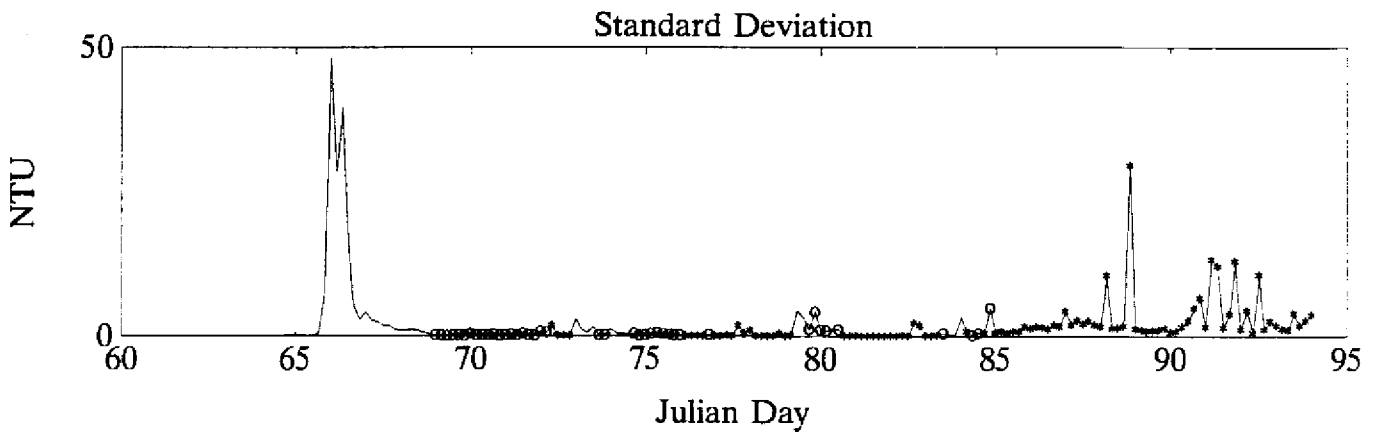
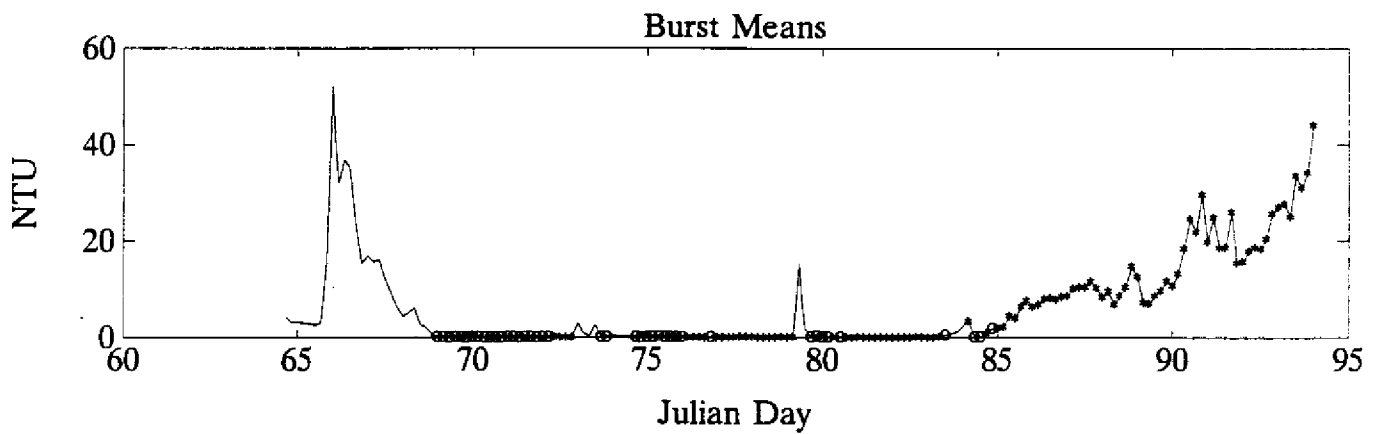
From: March 6, 1990, Julian Day - 64.67

To: April 5, 1990, Julian Day - 94.16

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H022

Sensor Elevation = 0.2m

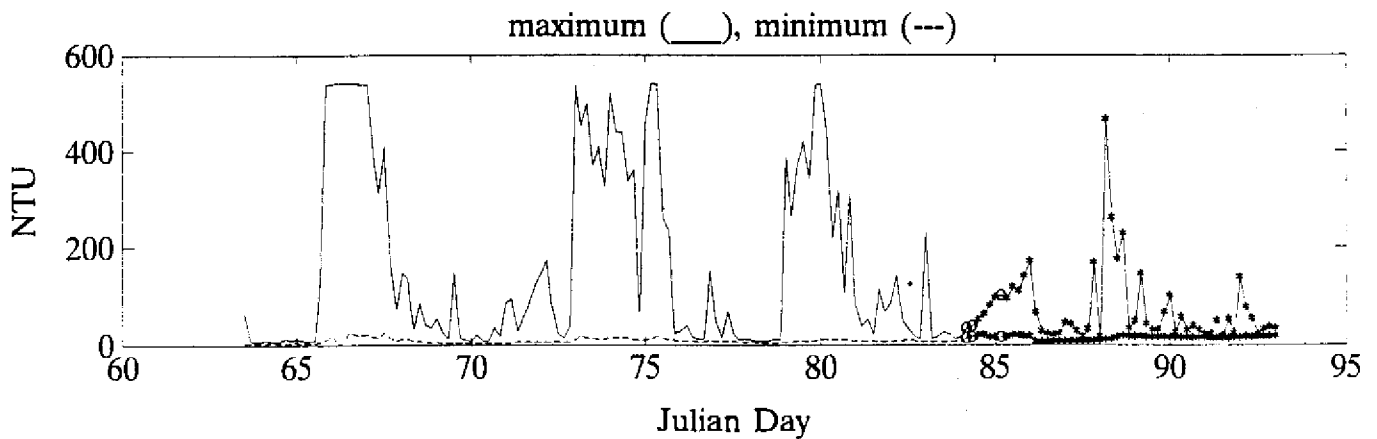
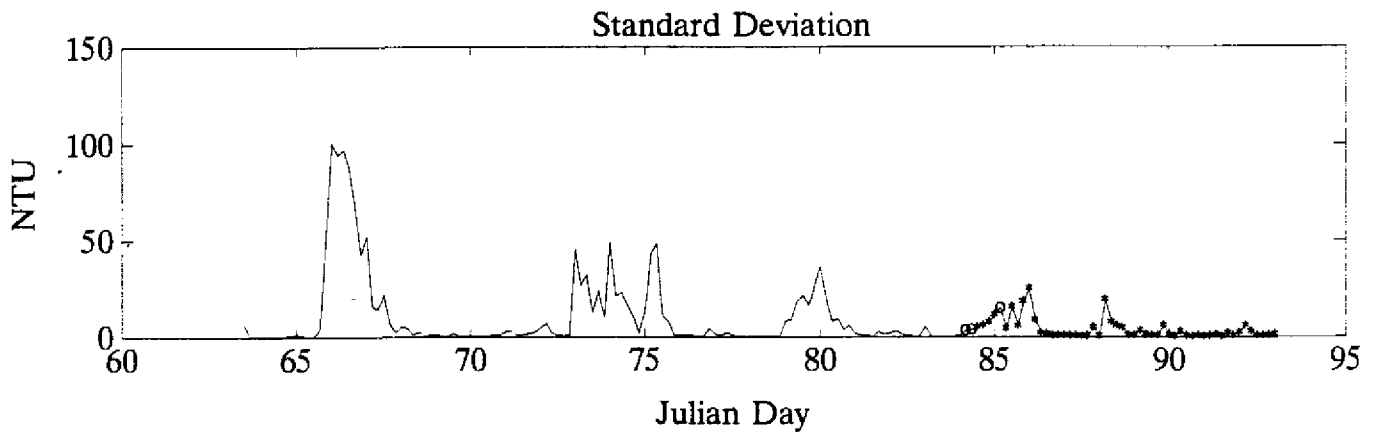
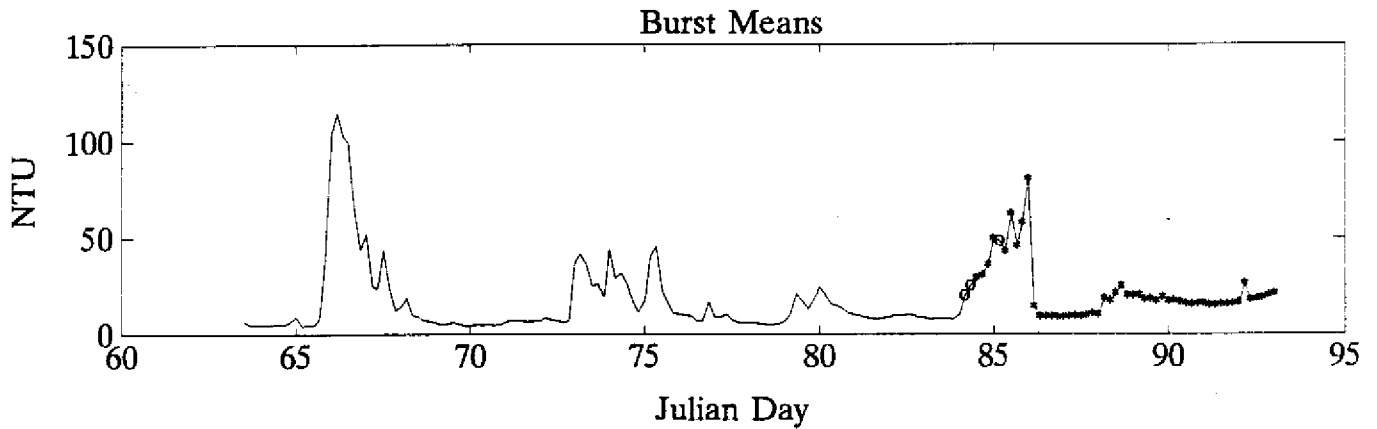
From: March 5, 1990, Julian Day - 63.67

To: April 5, 1990, Julian Day - 94.16

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H022

Sensor Elevation = 0.3m

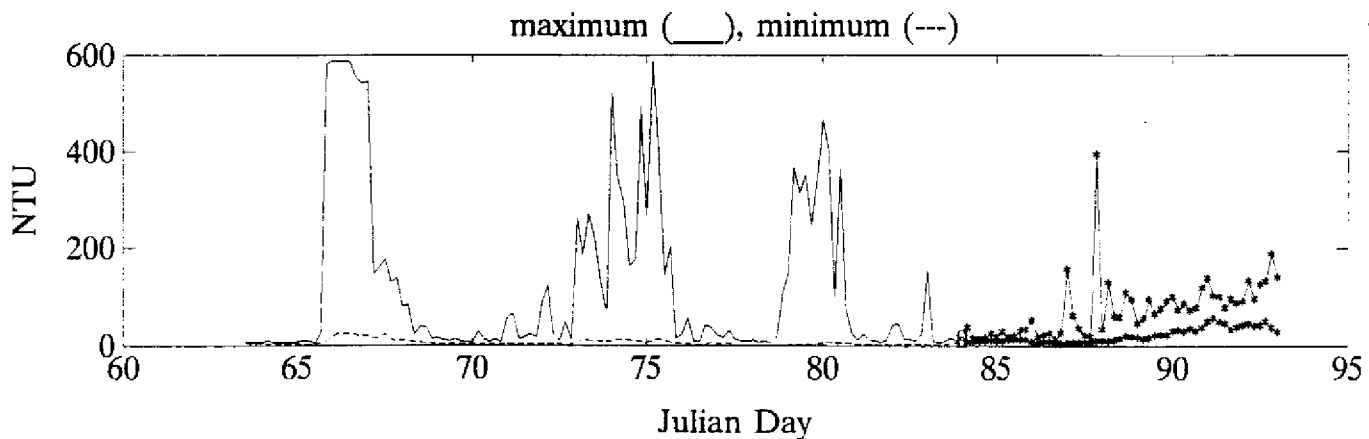
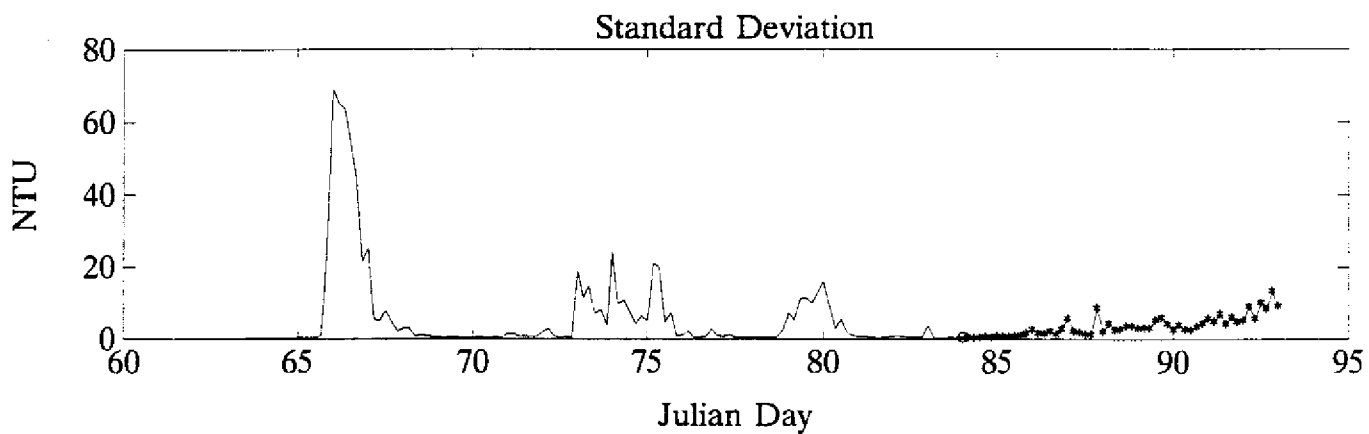
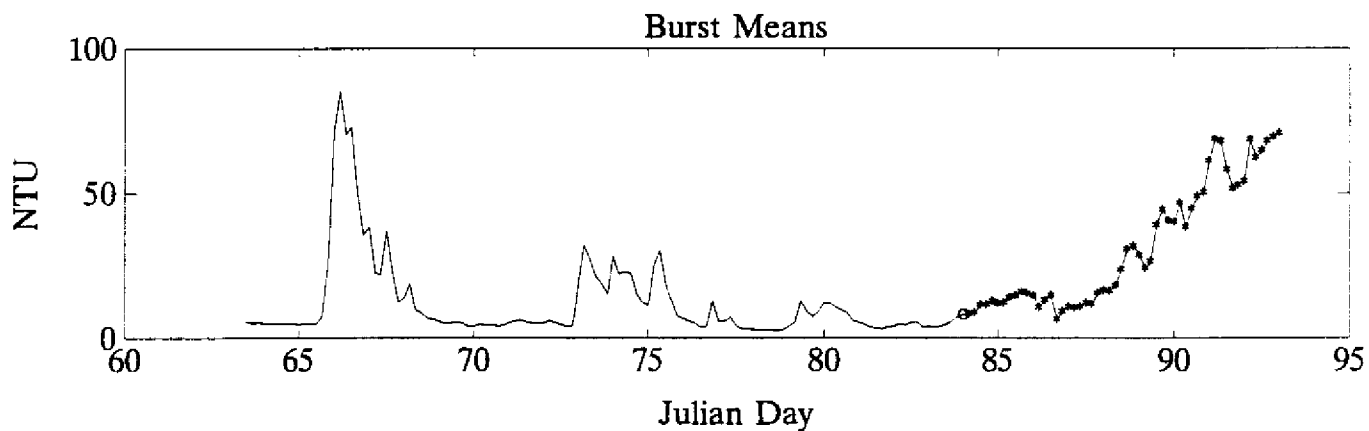
From: March 5, 1990, Julian Day - 63.67

To: April 5, 1990, Julian Day - 94.16

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H031

Sensor Elevation = 0.3m

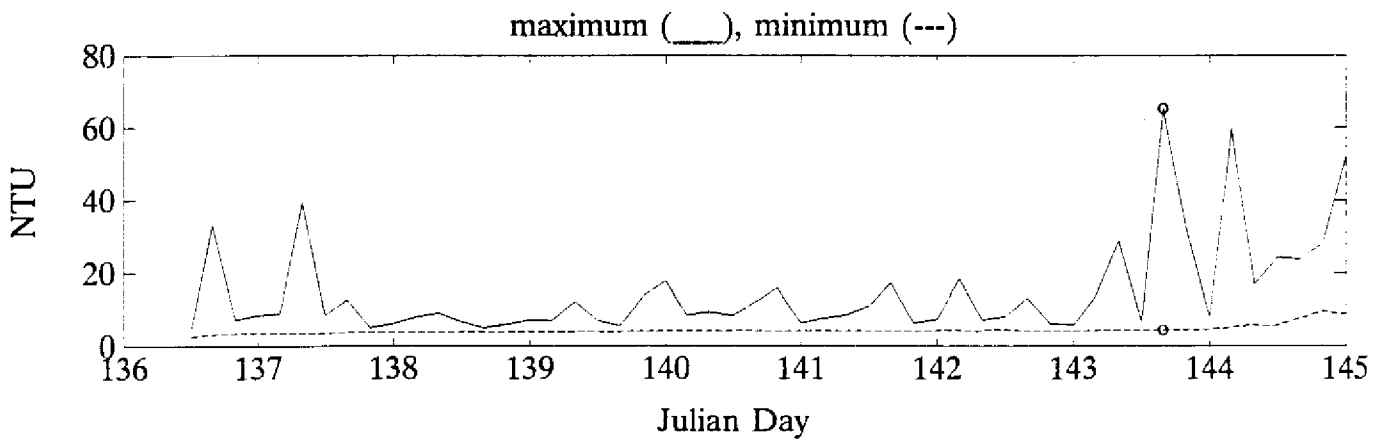
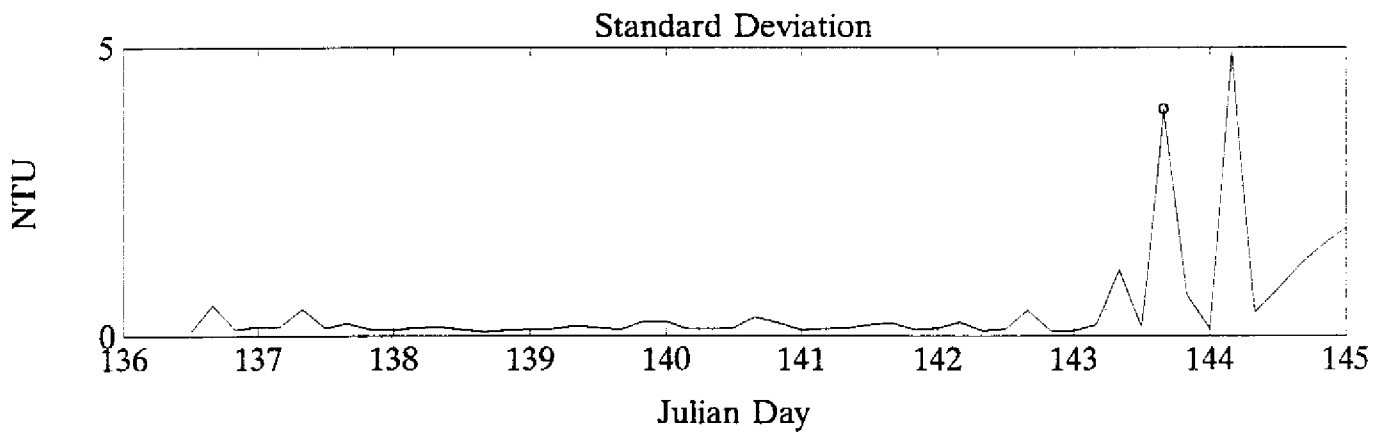
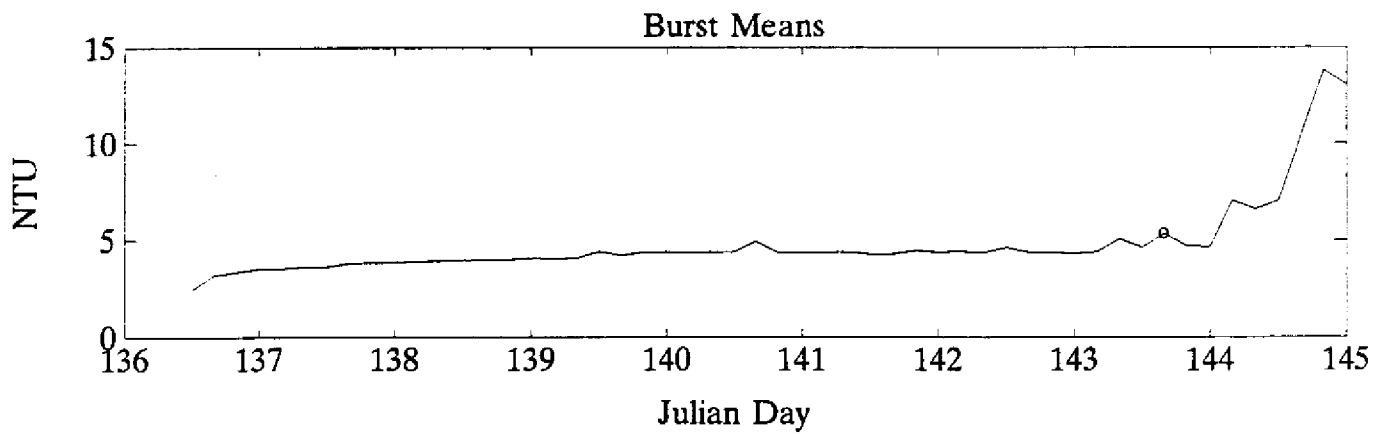
From: May 17, 1990, Julian Day - 136.5

To: May 26, 1990, Julian Day - 145.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H032

Sensor Elevation = 0.1m

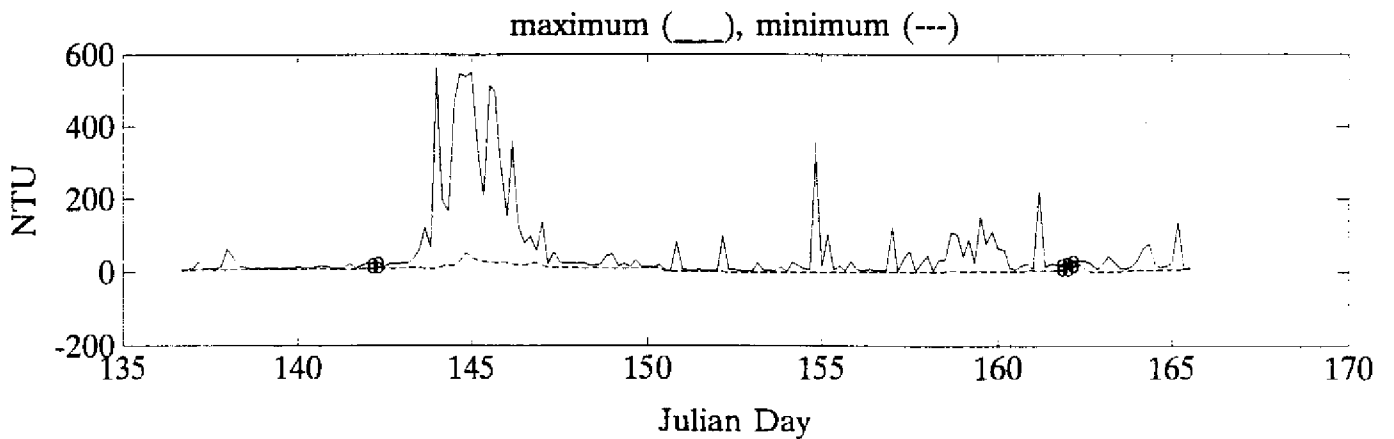
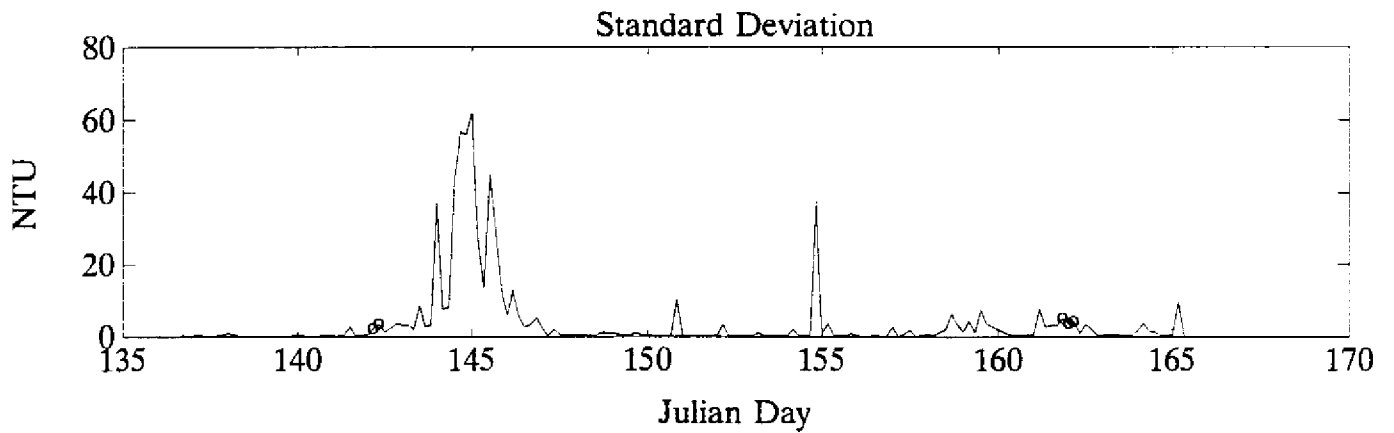
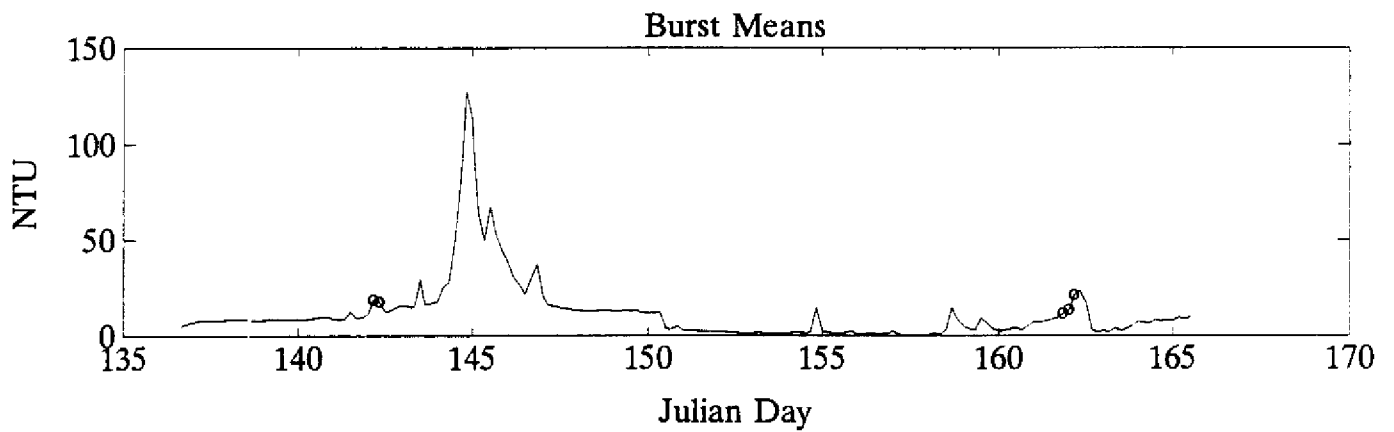
From: May 17, 1990, Julian Day - 136.5

To: June 15, 1990, Julian Day - 165.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H032

Sensor Elevation = 0.2m

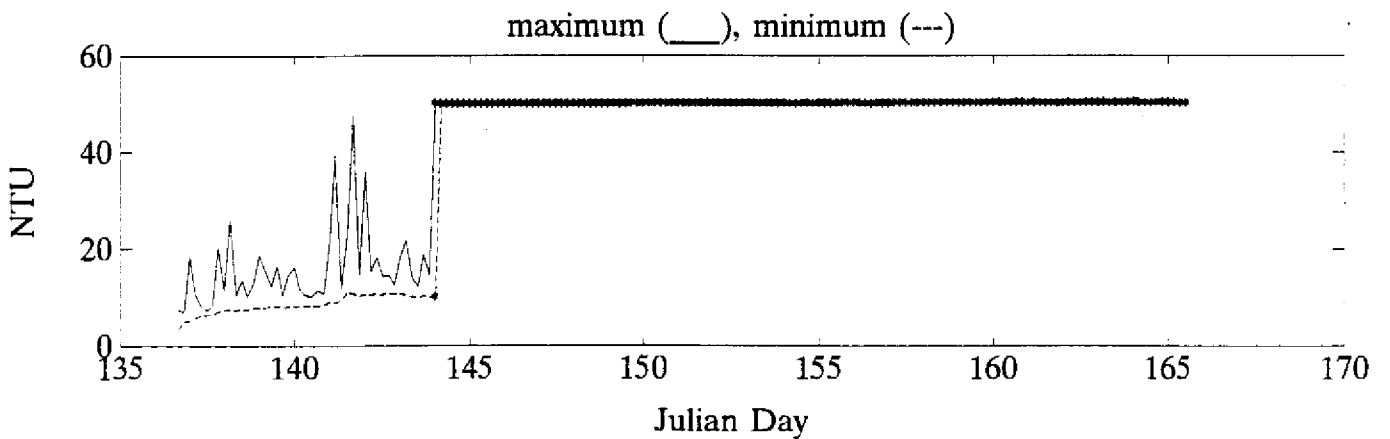
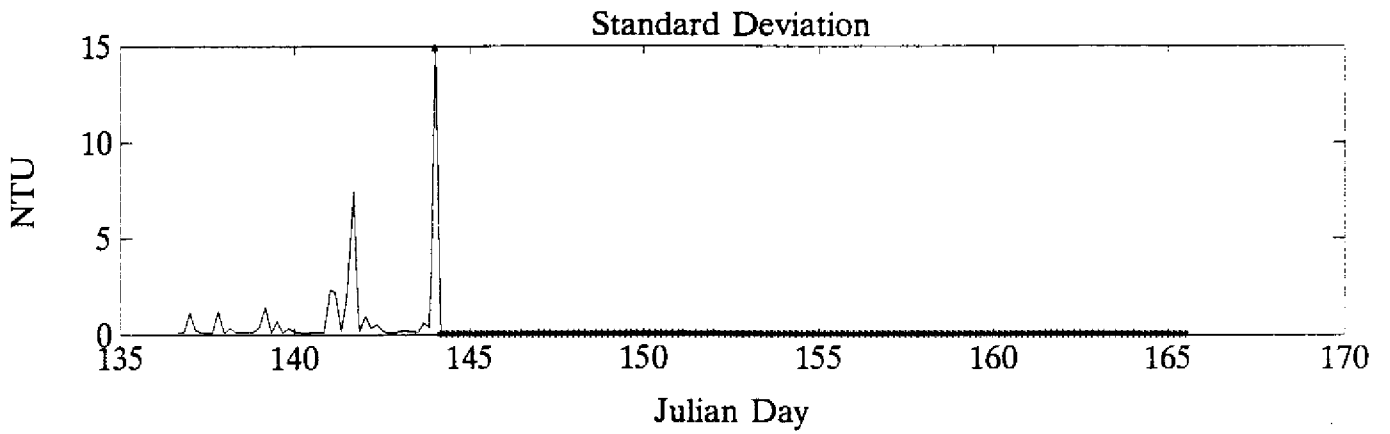
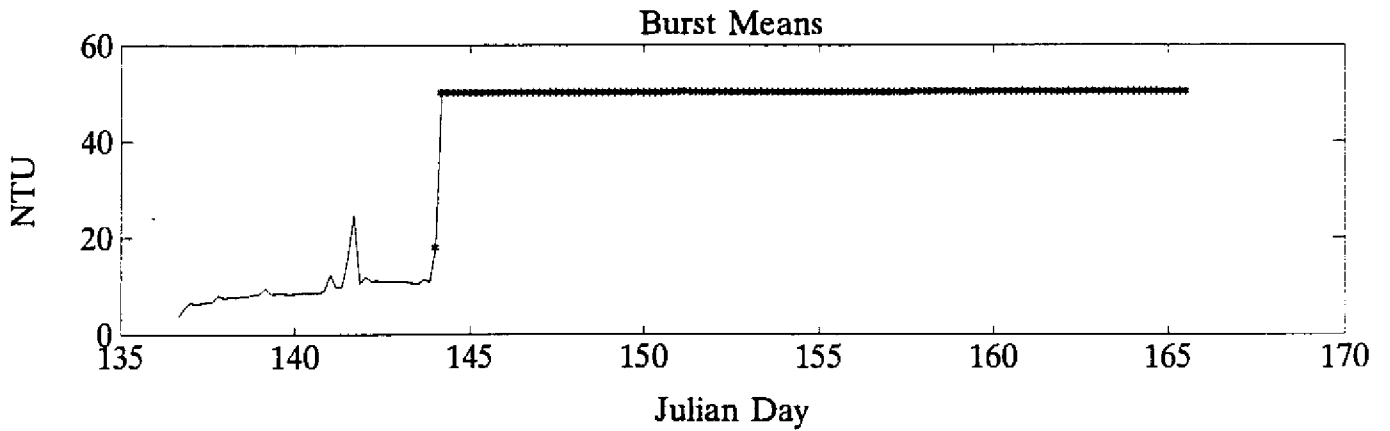
From: May 17, 1990, Julian Day - 136.5

To: June 15, 1990, Julian Day - 165.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H041

Sensor Elevation = 0.3m

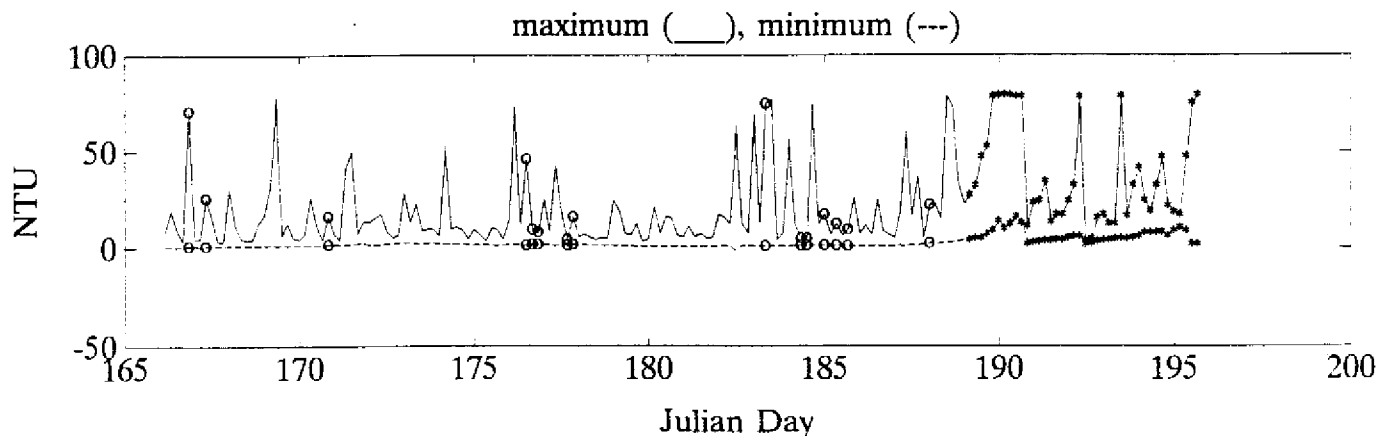
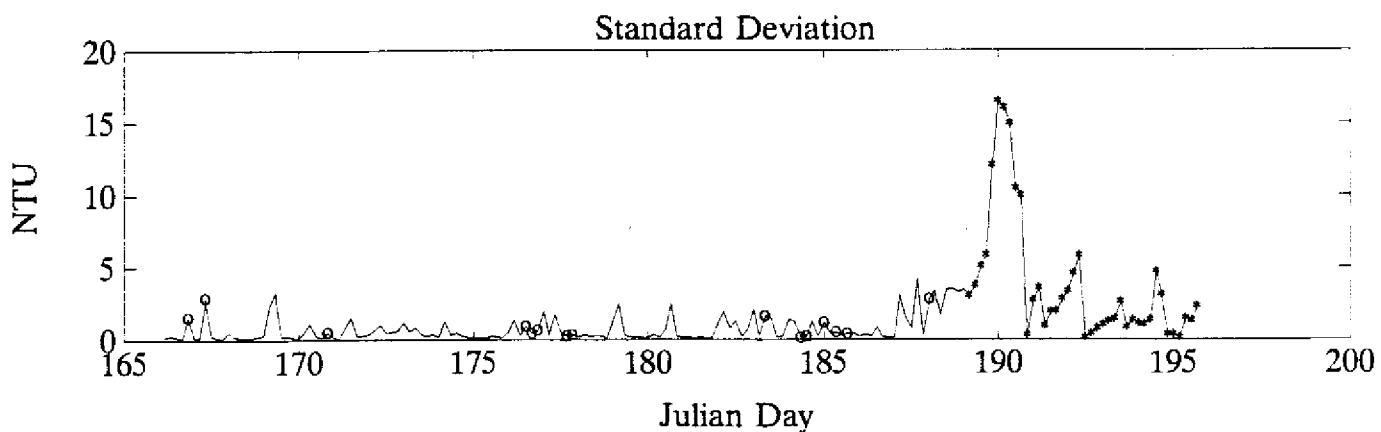
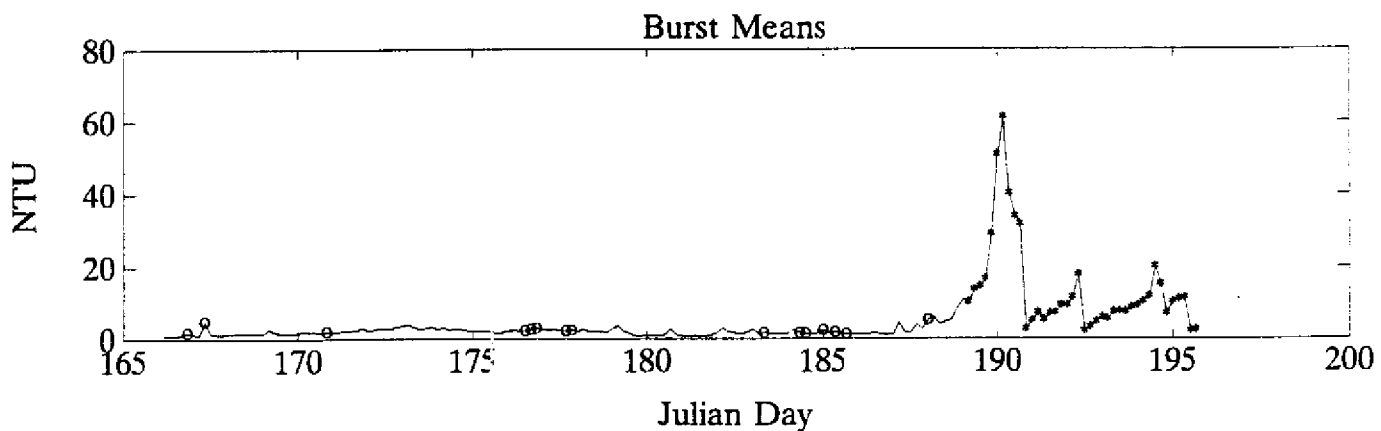
From: June 15, 1990, Julian Day - 165.5

To: July 15, 1990, Julian Day - 195.6

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H041

Sensor Elevation = 0.6m

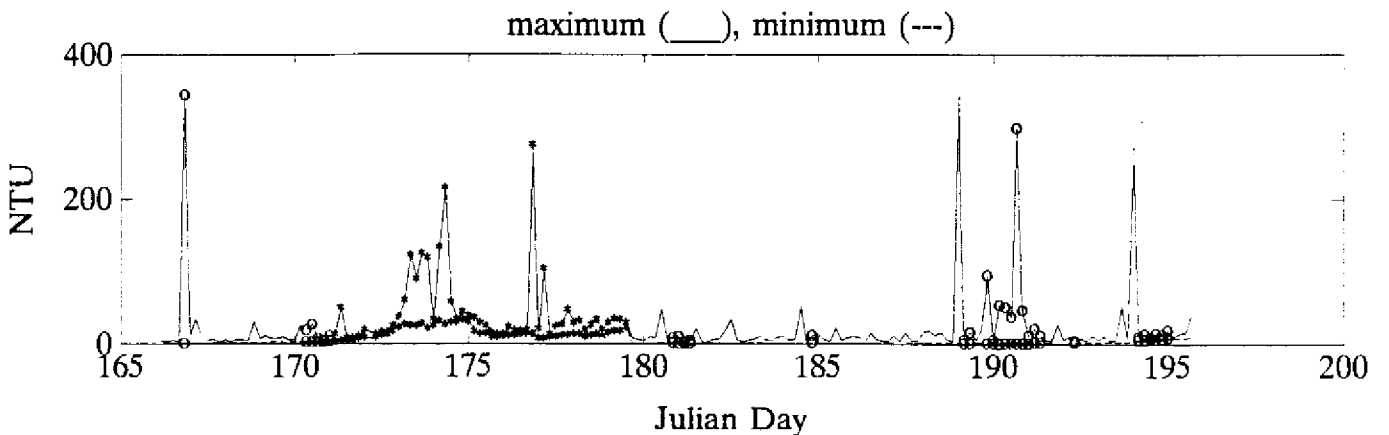
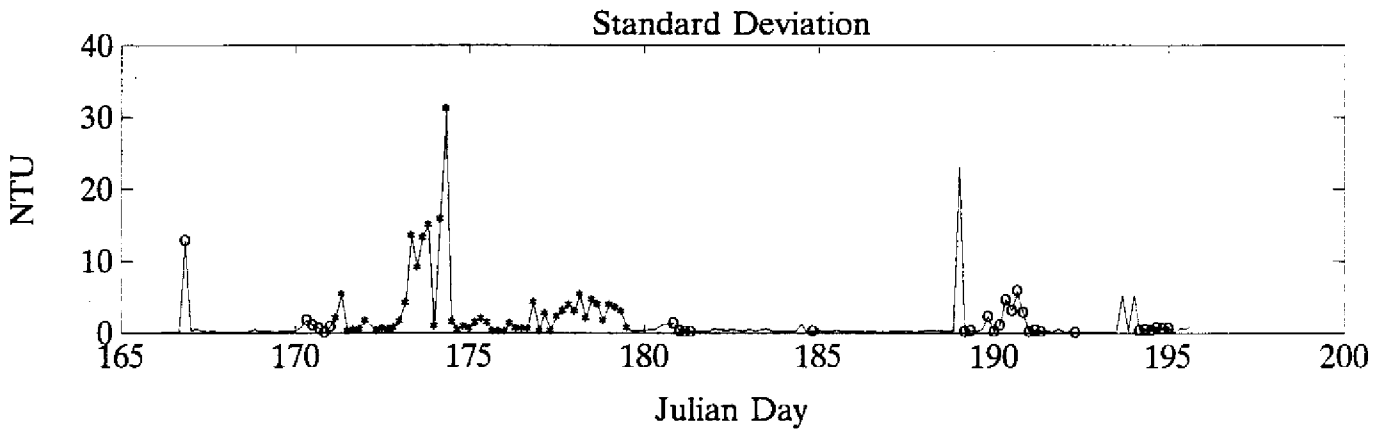
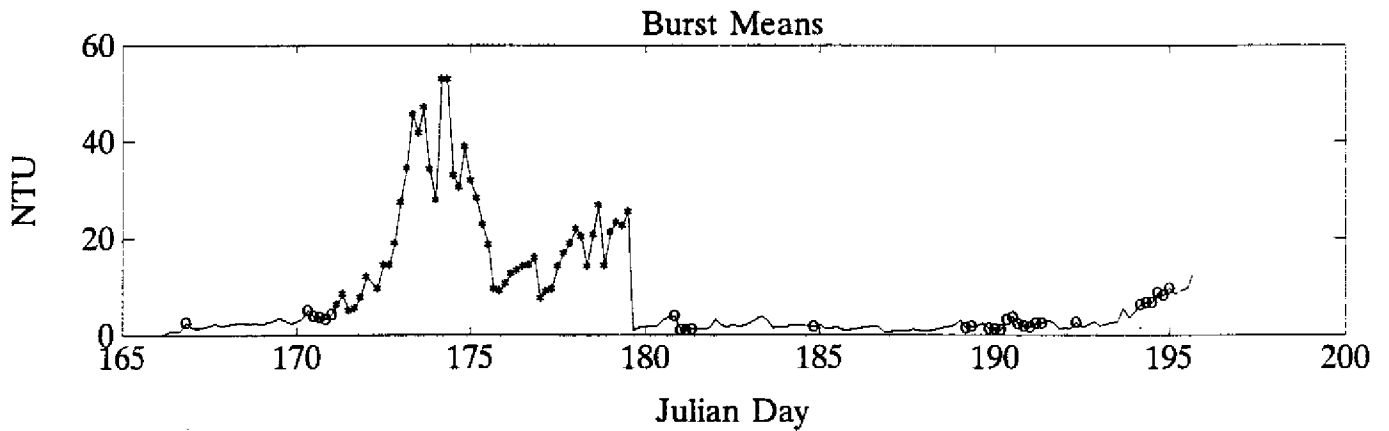
From: June 15, 1990, Julian Day - 165.5

To: July 15, 1990, Julian Day - 195.6

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H042

Sensor Elevation = 0.2m

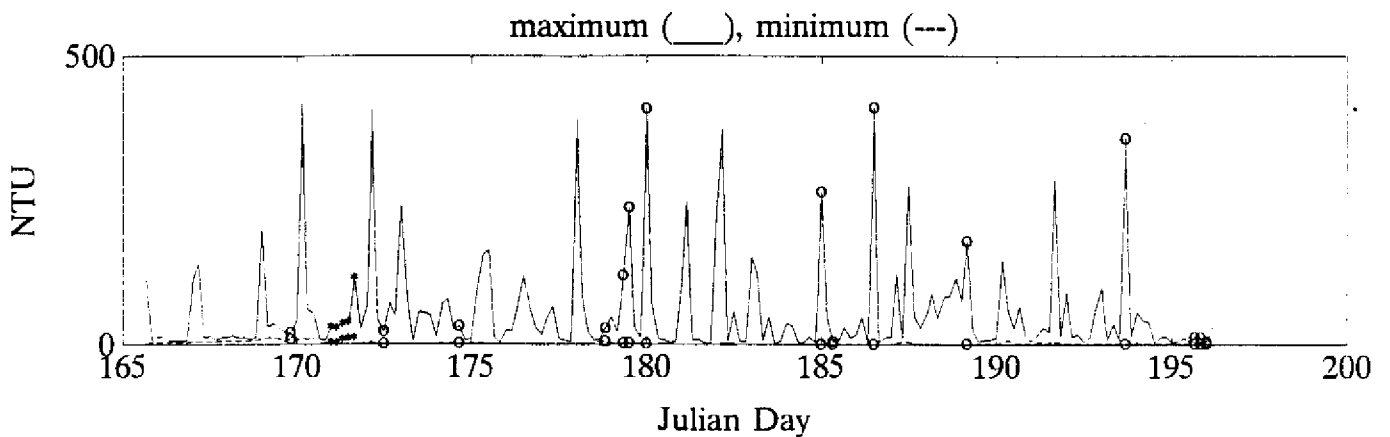
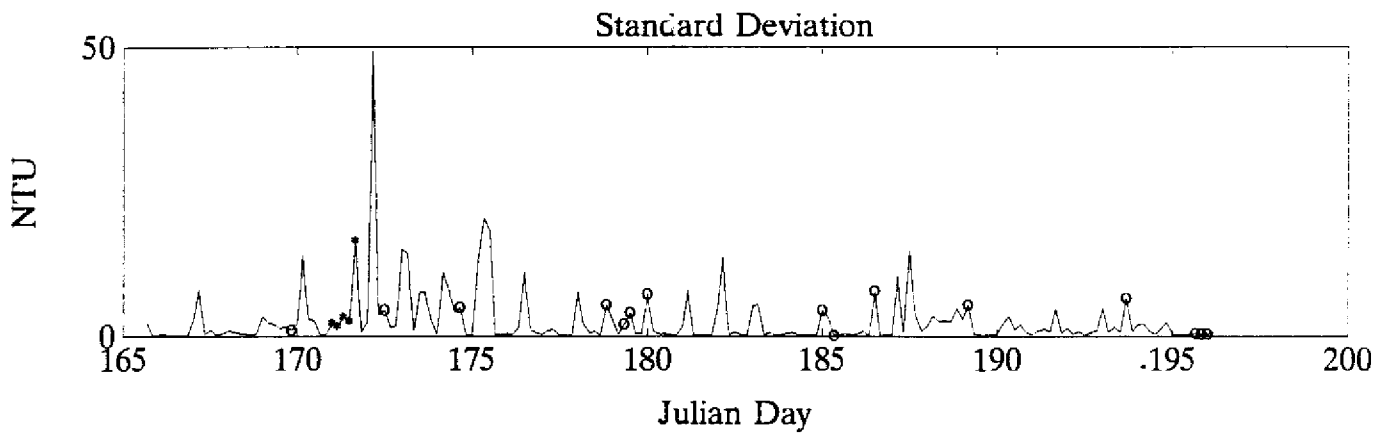
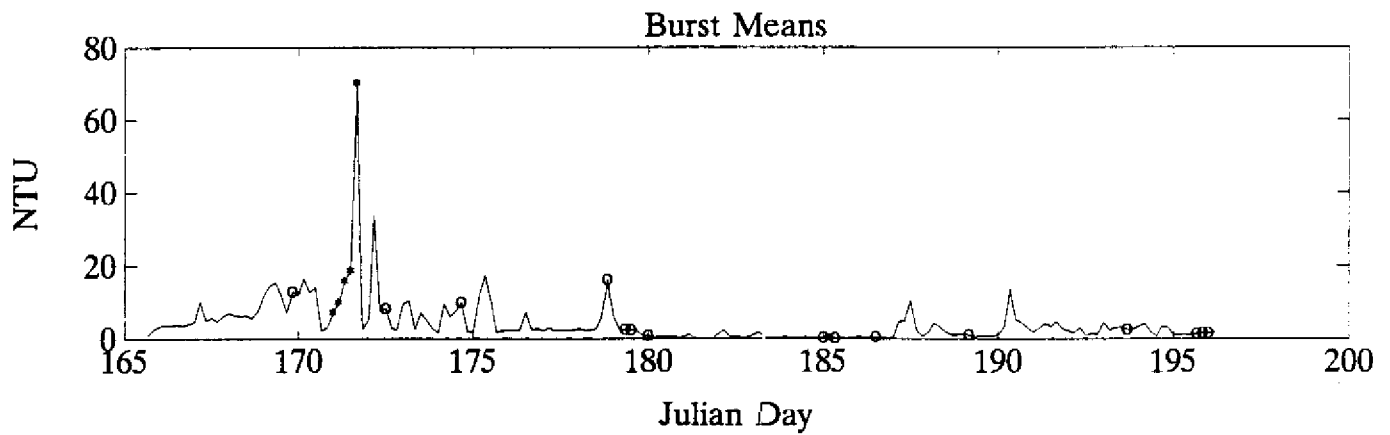
From: June 15, 1990, Julian Day - 165.5

To: July 16, 1990, Julian Day - 196.6

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H042

Sensor Elevation = 0.5m

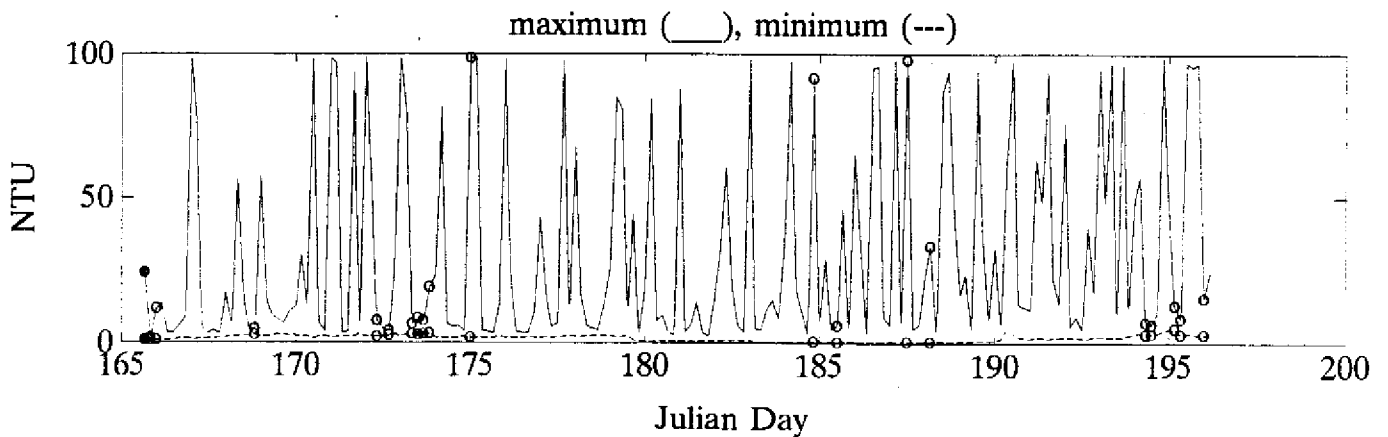
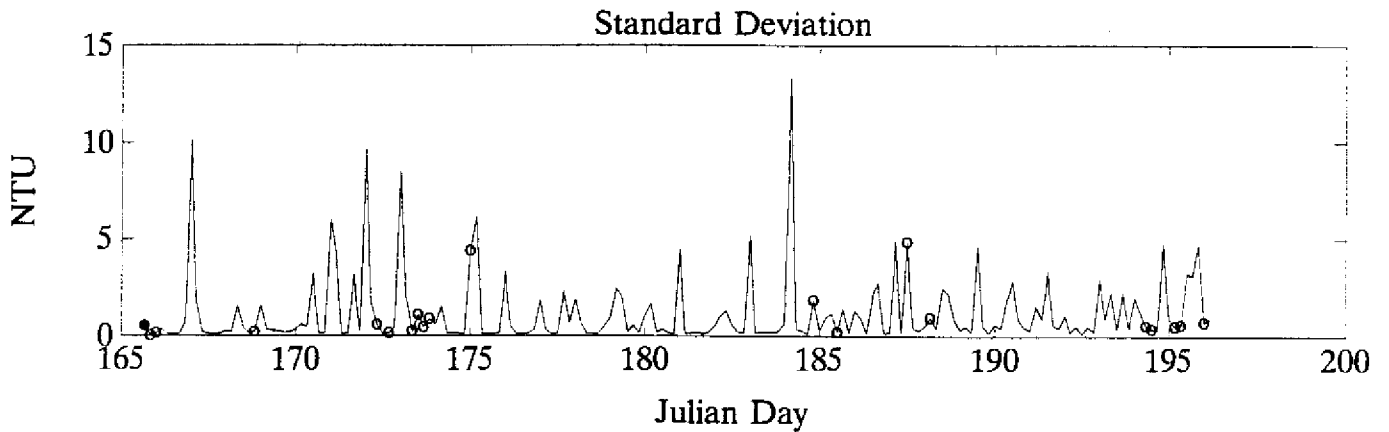
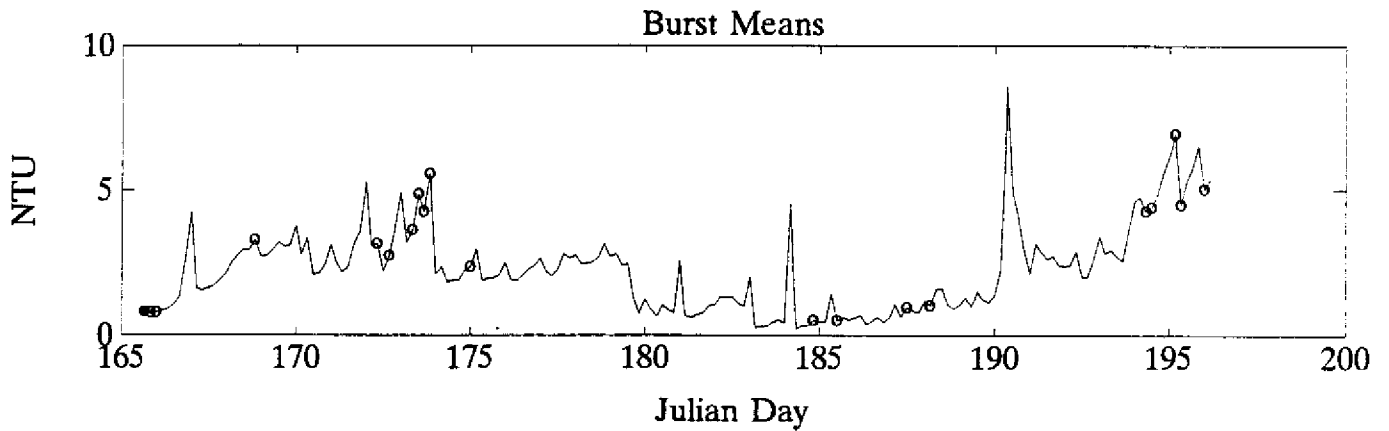
From: June 15, 1990, Julian Day - 165.5

To: July 16, 1990, Julian Day - 196.6

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H051

Sensor Elevation = 0.1m

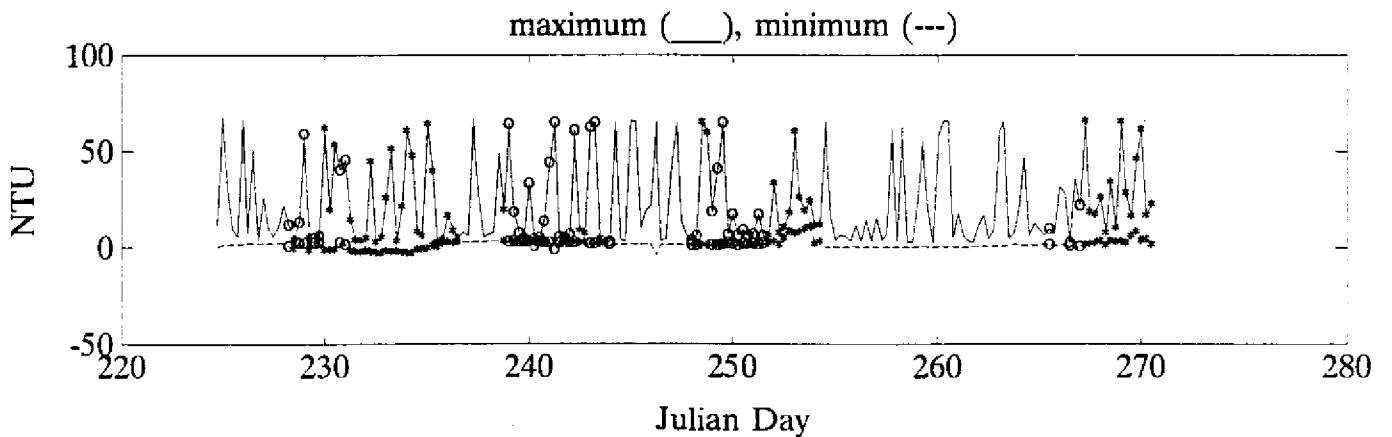
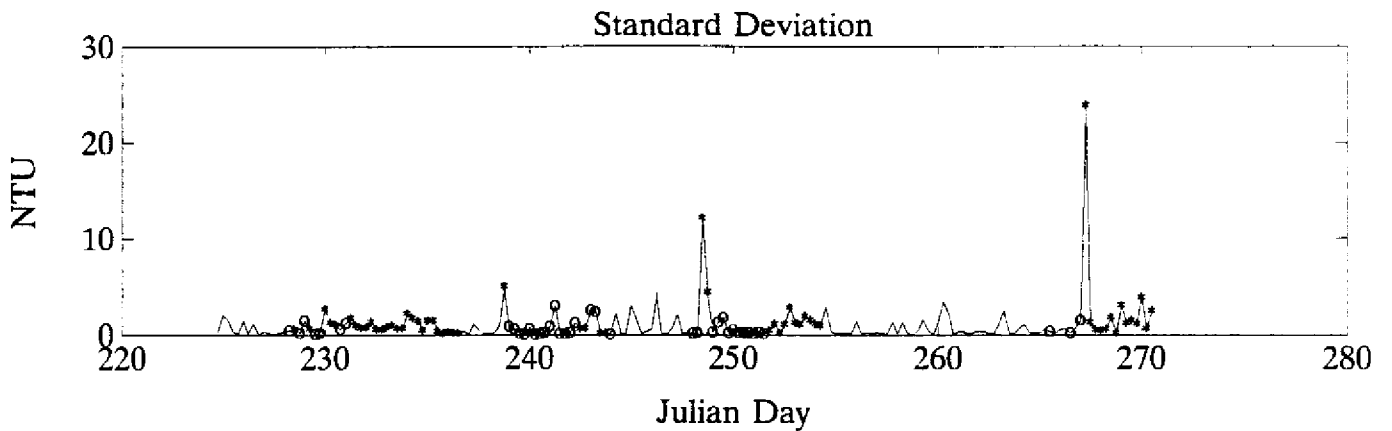
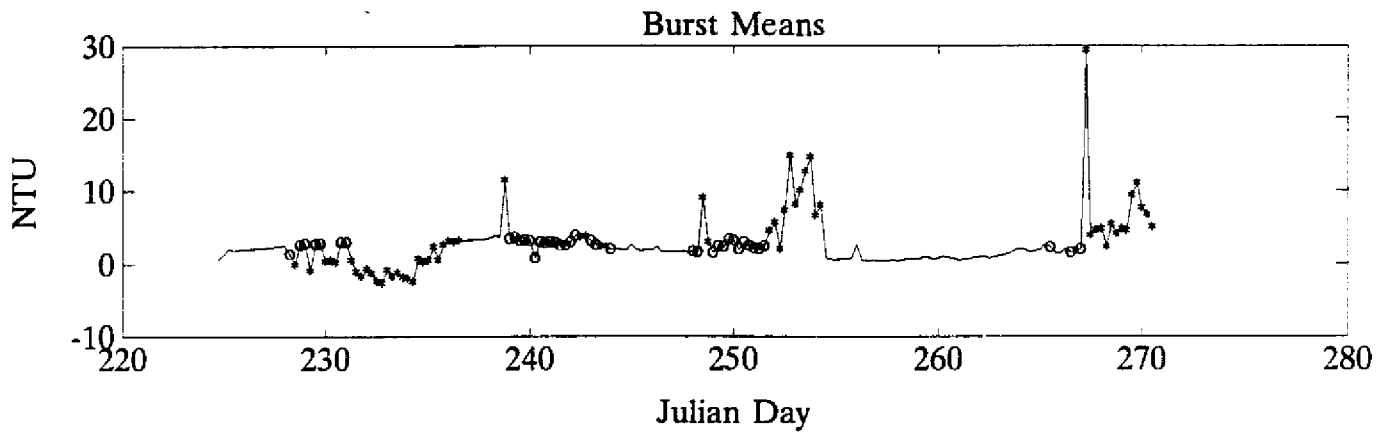
From: August 13, 1990, Julian Day - 224.75

To: September 28, 1990, Julian Day - 270.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H051

Sensor Elevation = 0.8m

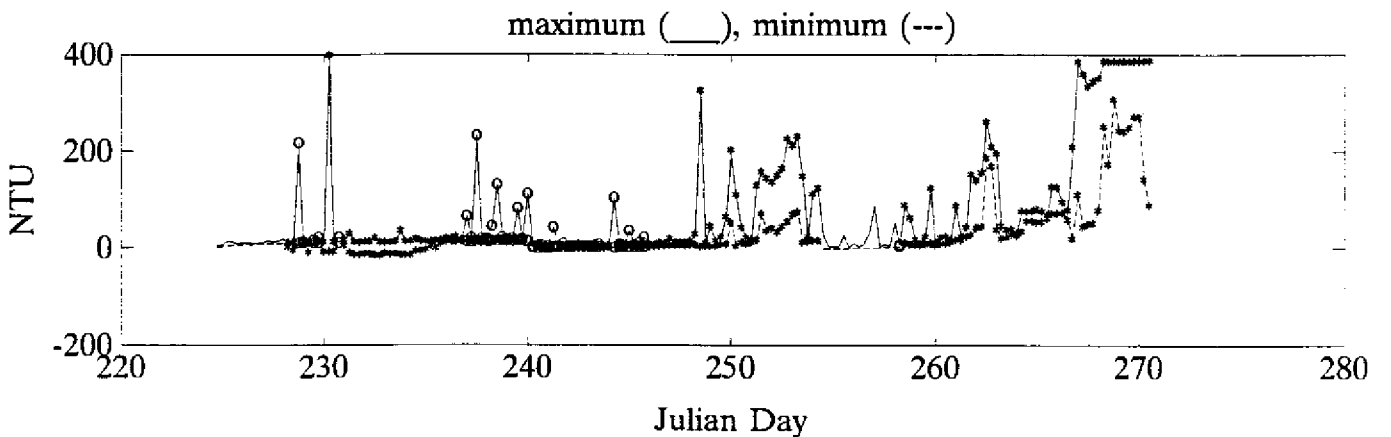
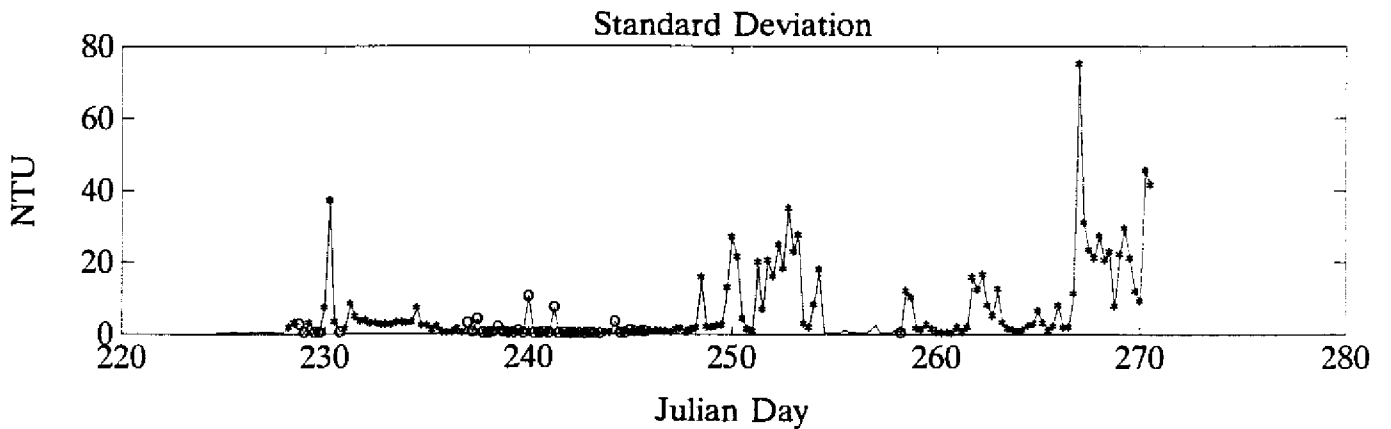
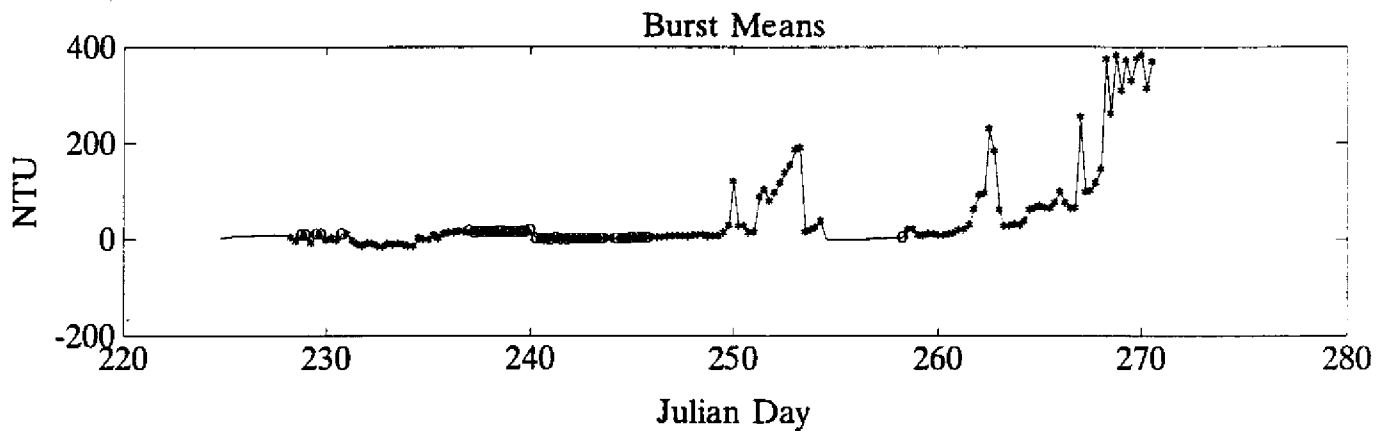
From: August 13, 1990, Julian Day - 224.75

To: September 28, 1990, Julian Day - 270.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H052

Sensor Elevation = 0.1m

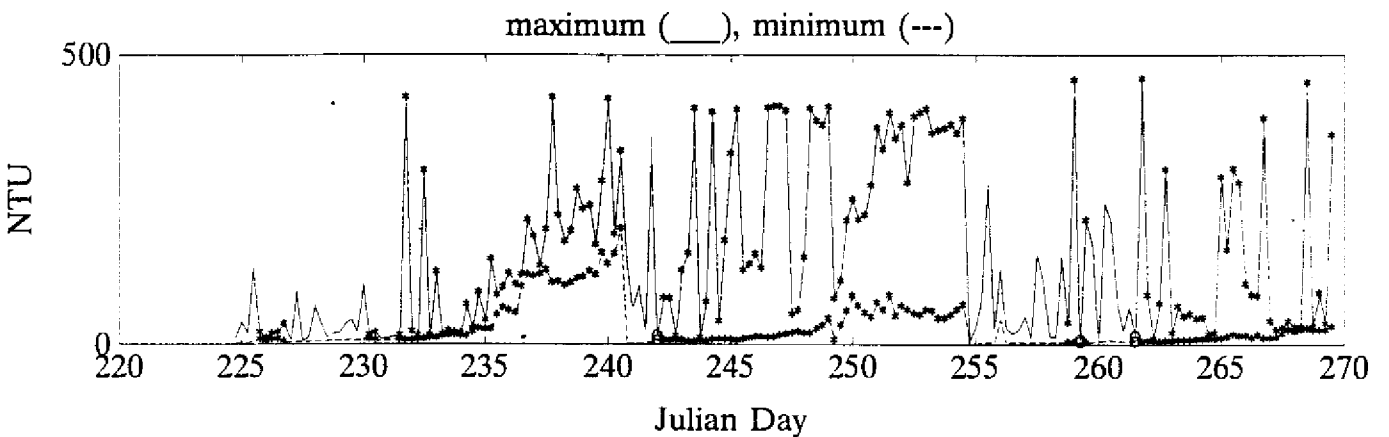
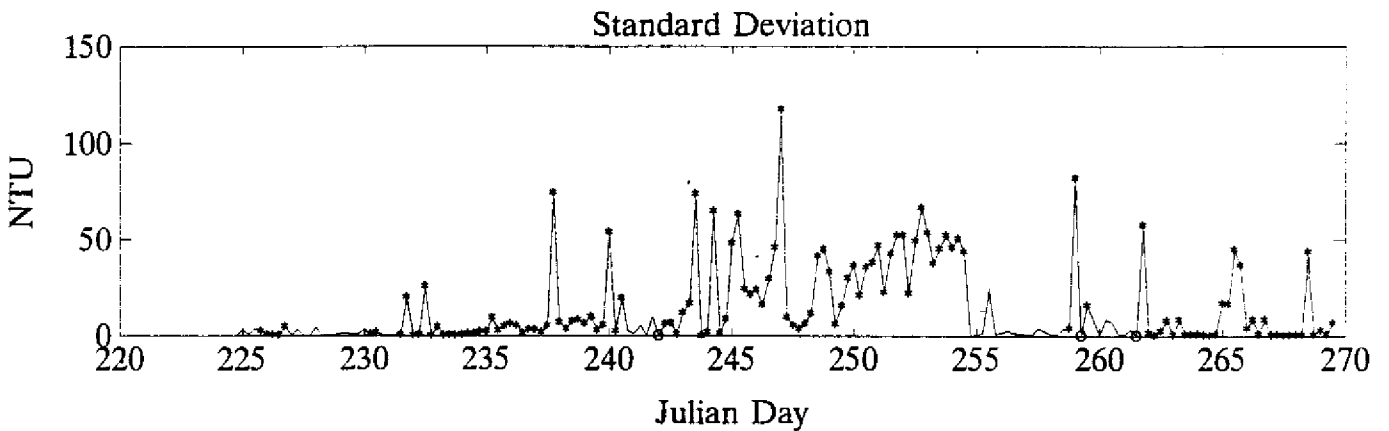
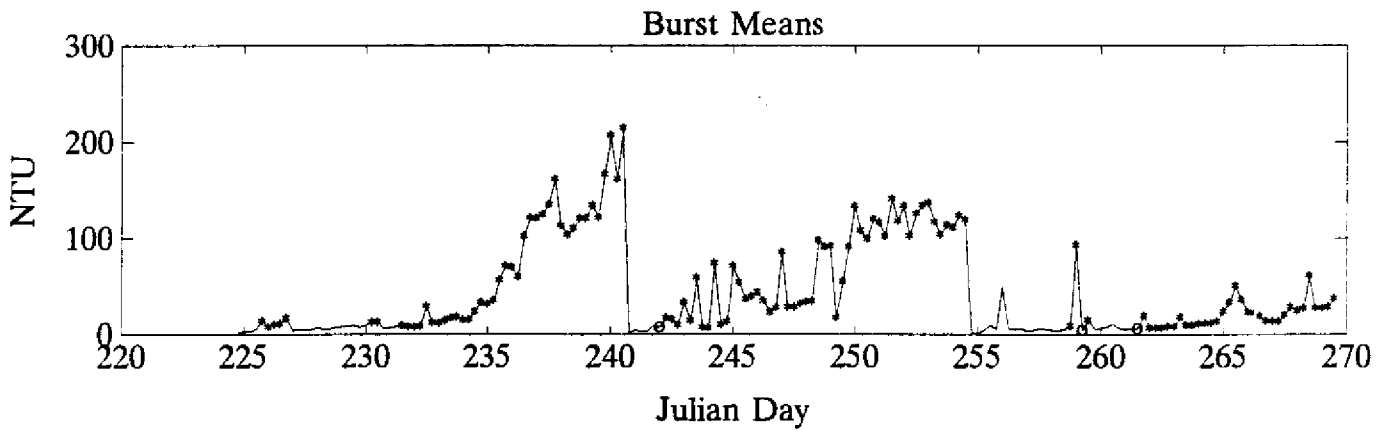
From: August 13, 1990, Julian Day - 224.75

To: September 28, 1990, Julian Day - 270.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H052

Sensor Elevation = 0.77m

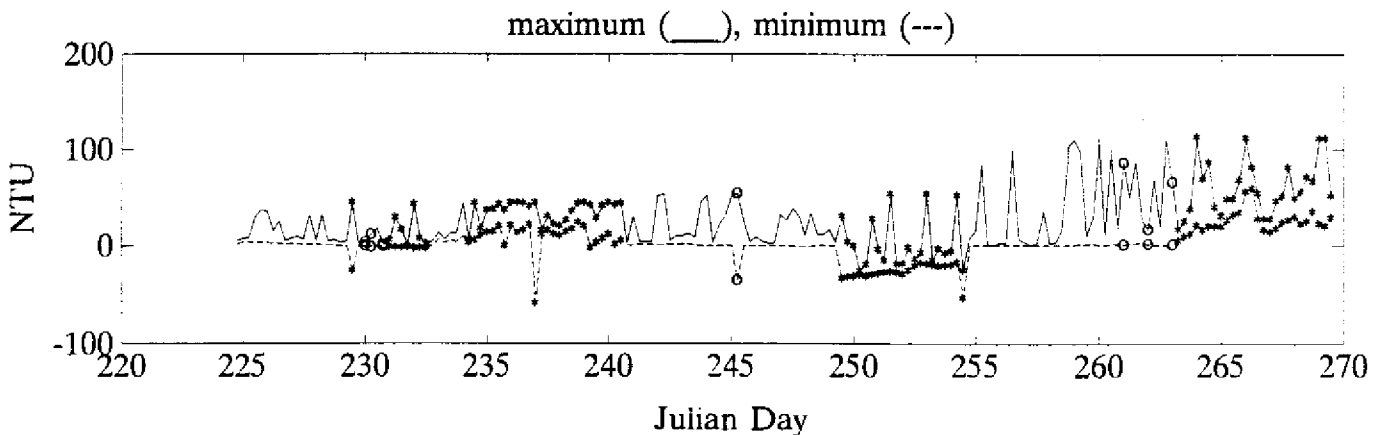
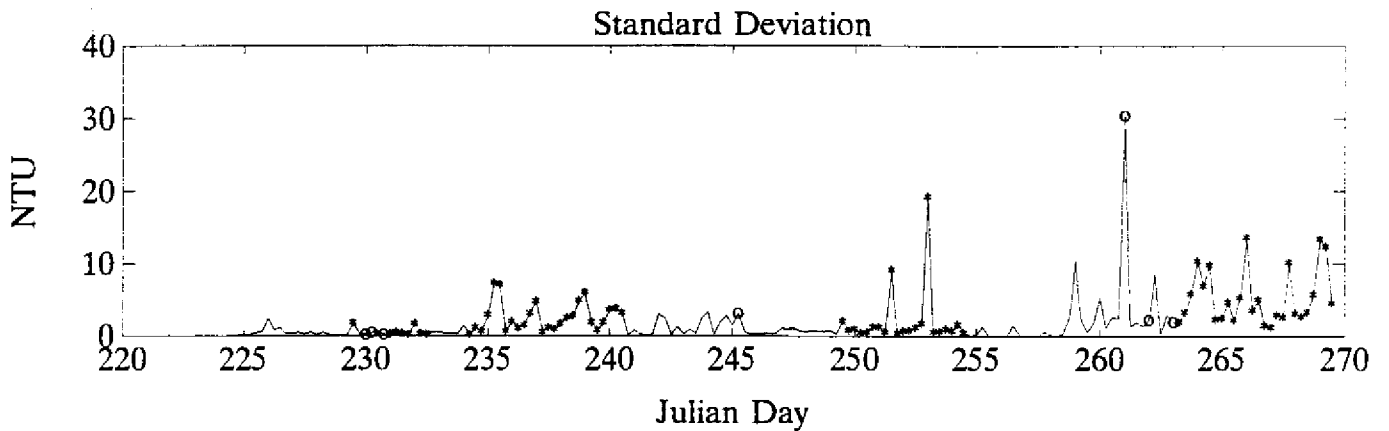
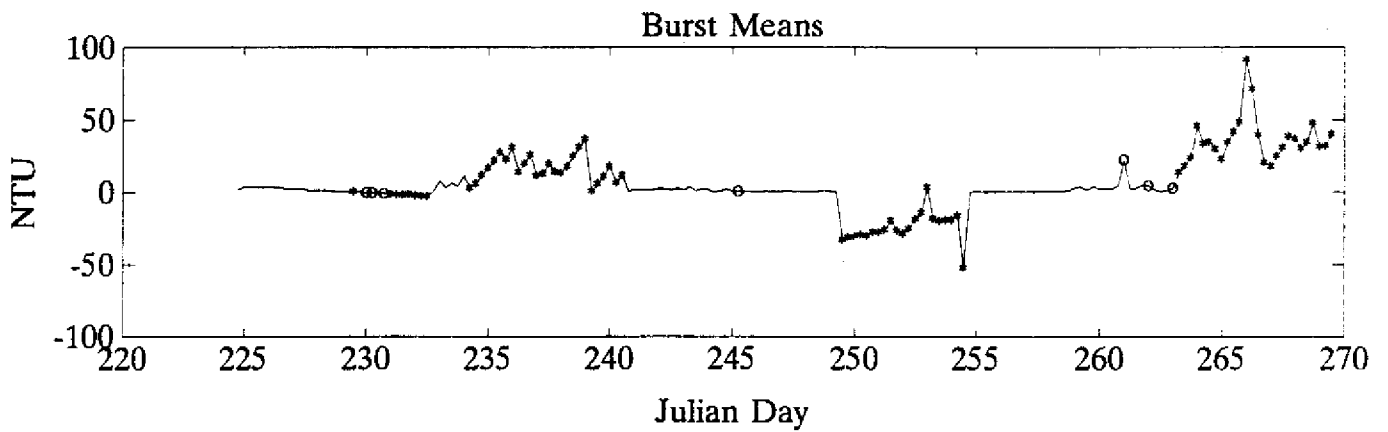
From: August 13, 1990, Julian Day - 224.75

To: September 28, 1990, Julian Day - 270.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H062

Sensor Elevation = 0.1m

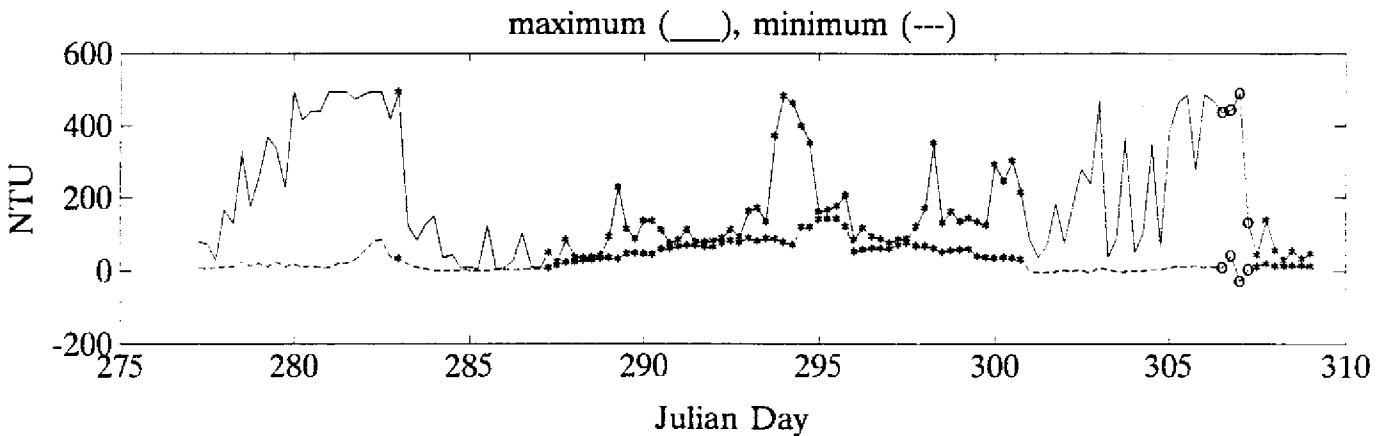
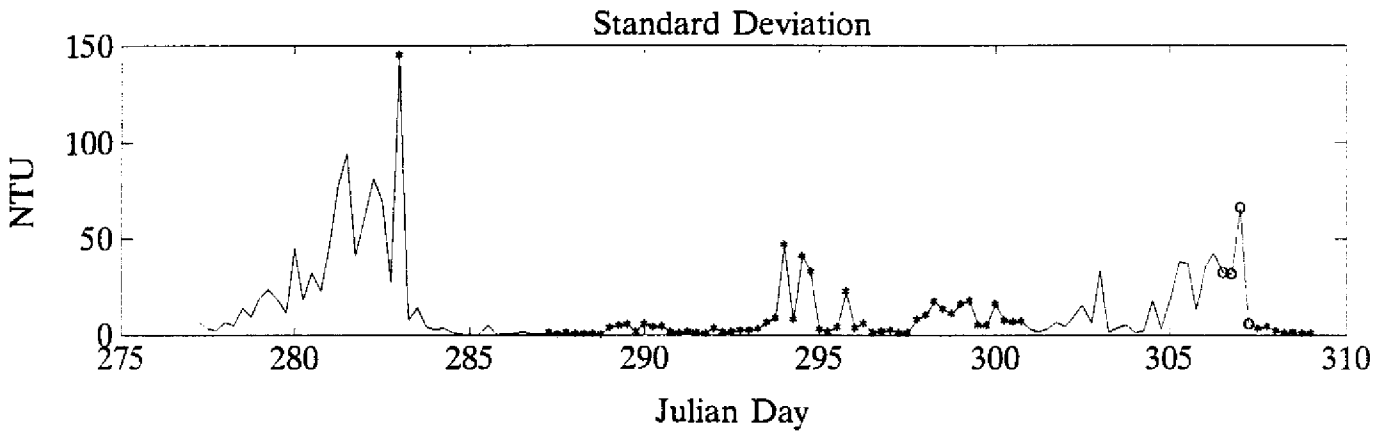
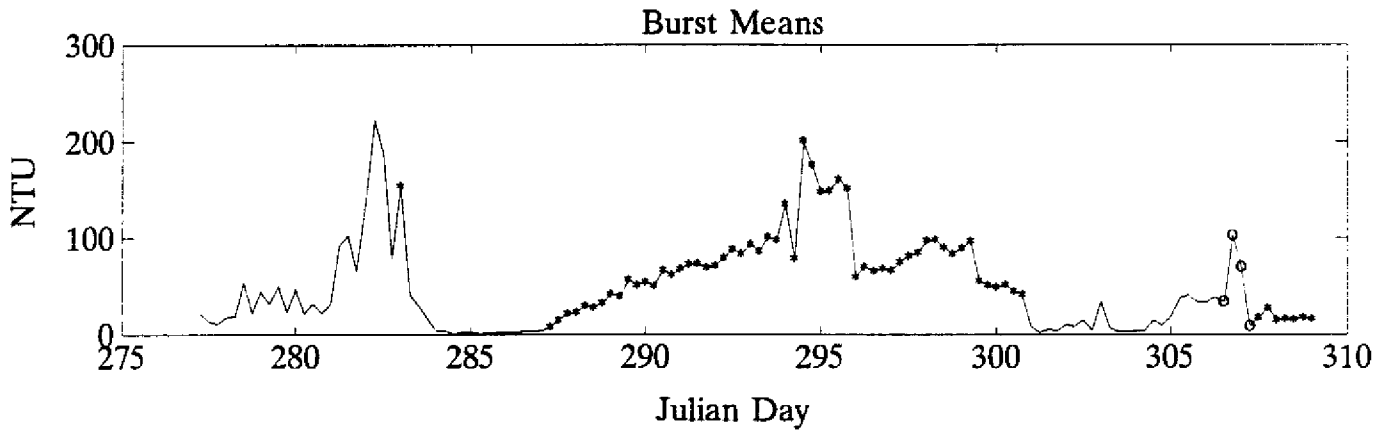
From: October 5, 1990, Julian Day - 277.5

To: November 8, 1990, Julian Day - 311.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H062

Sensor Elevation = 0.8m

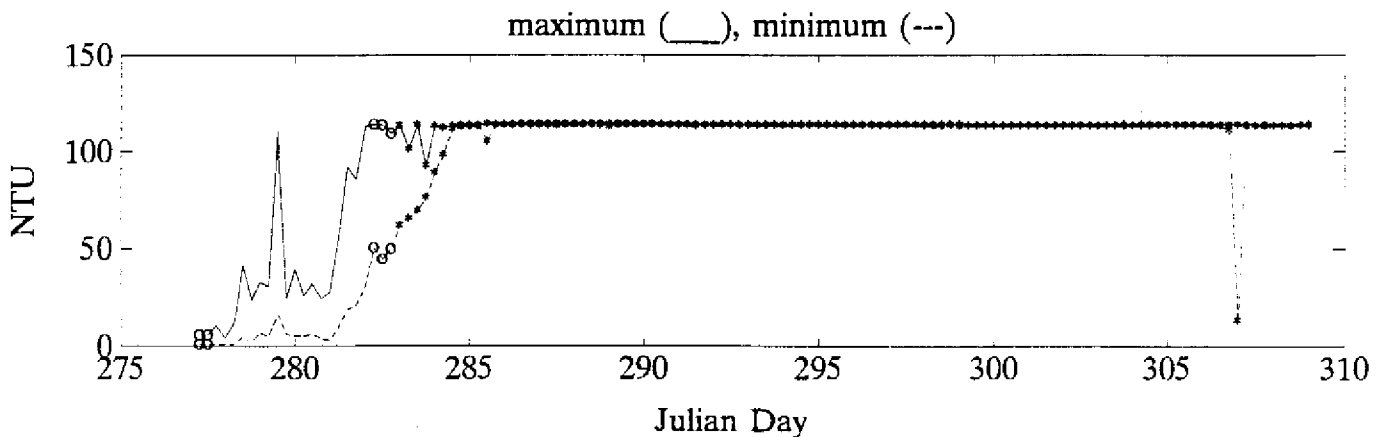
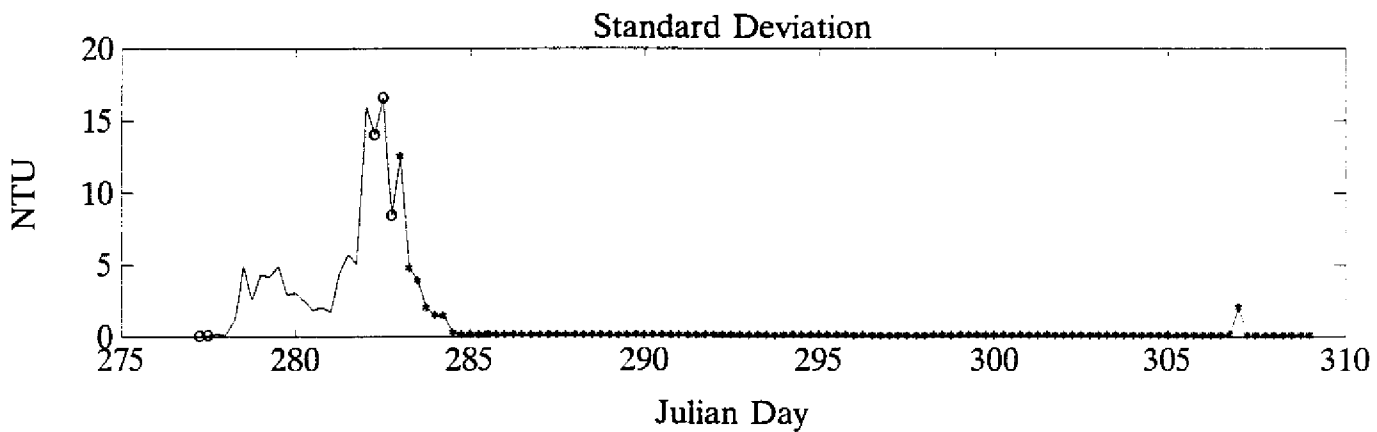
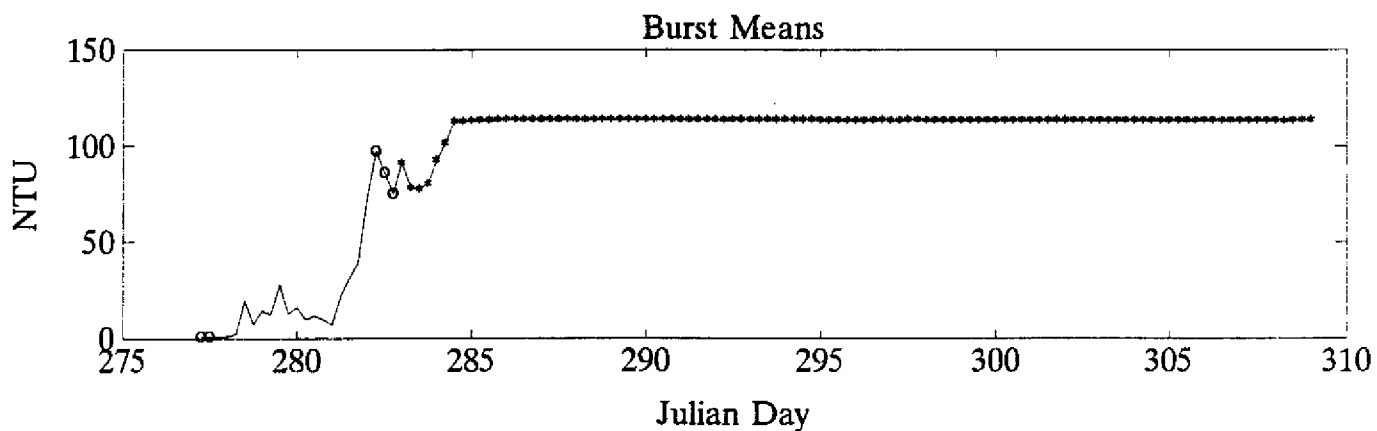
From: October 5, 1990, Julian Day - 277.5

To: November 8, 1990, Julian Day - 311.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H071

Sensor Elevation = 0.3m

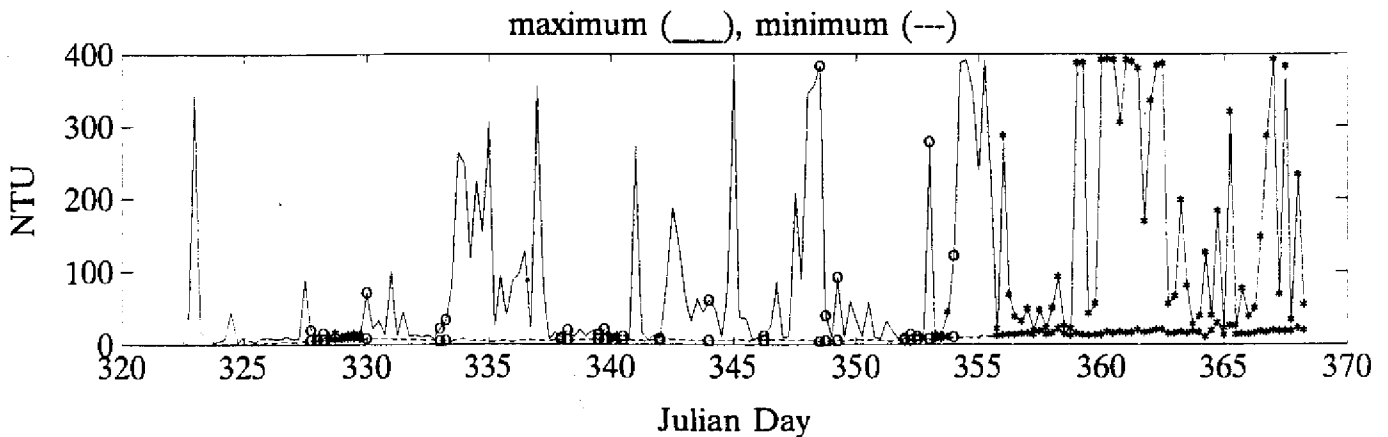
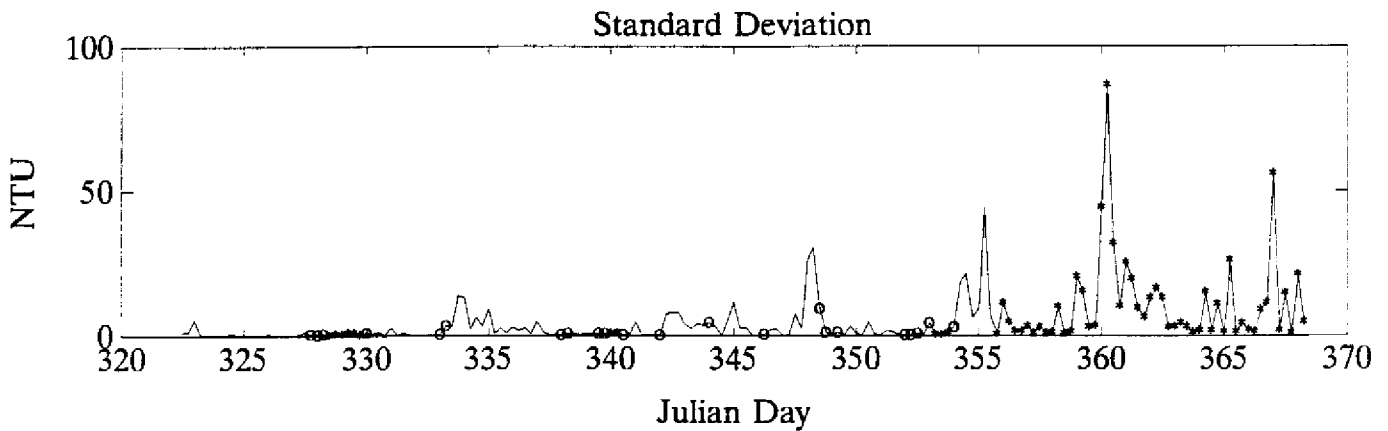
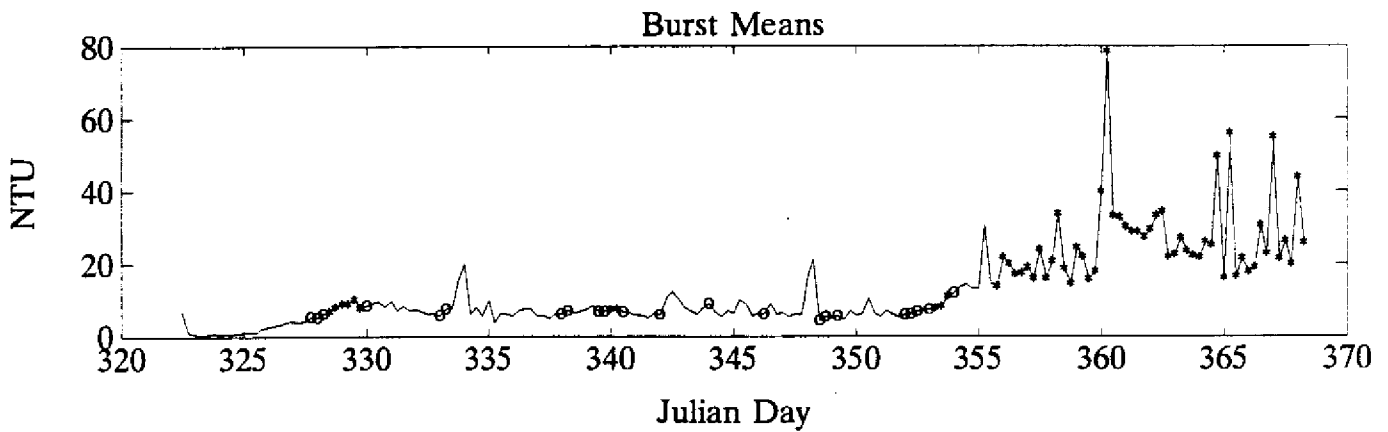
From: November 19, 1990, Julian Day - 322.5

To: January 8, 1991, Julian Day - 3.25

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H071

Sensor Elevation = 0.85m

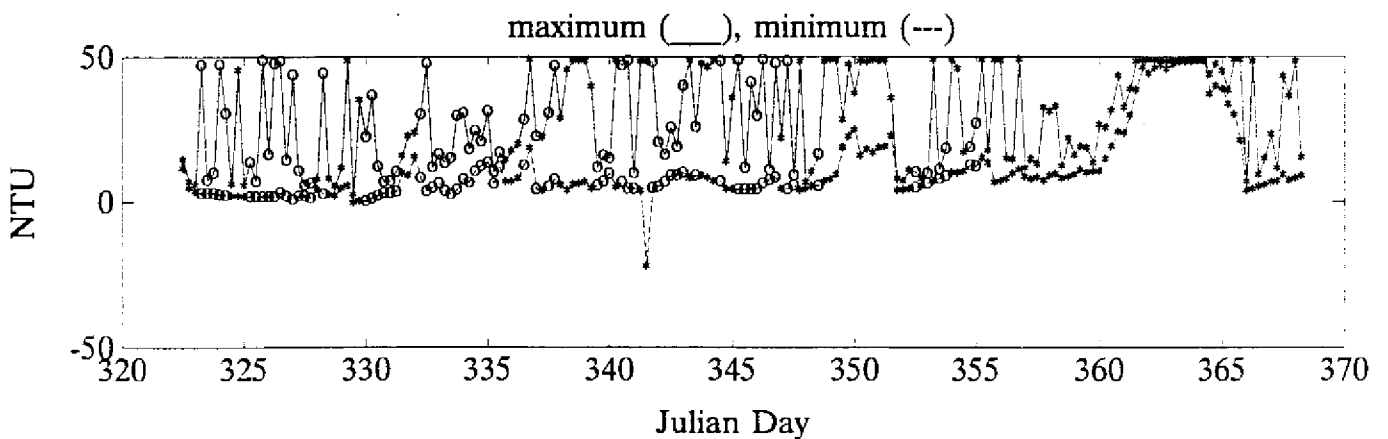
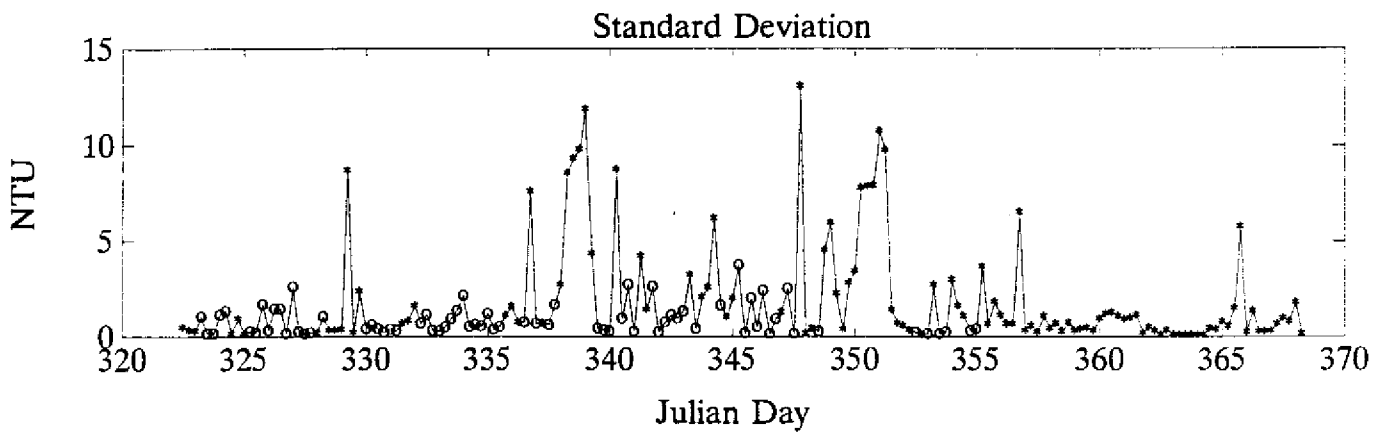
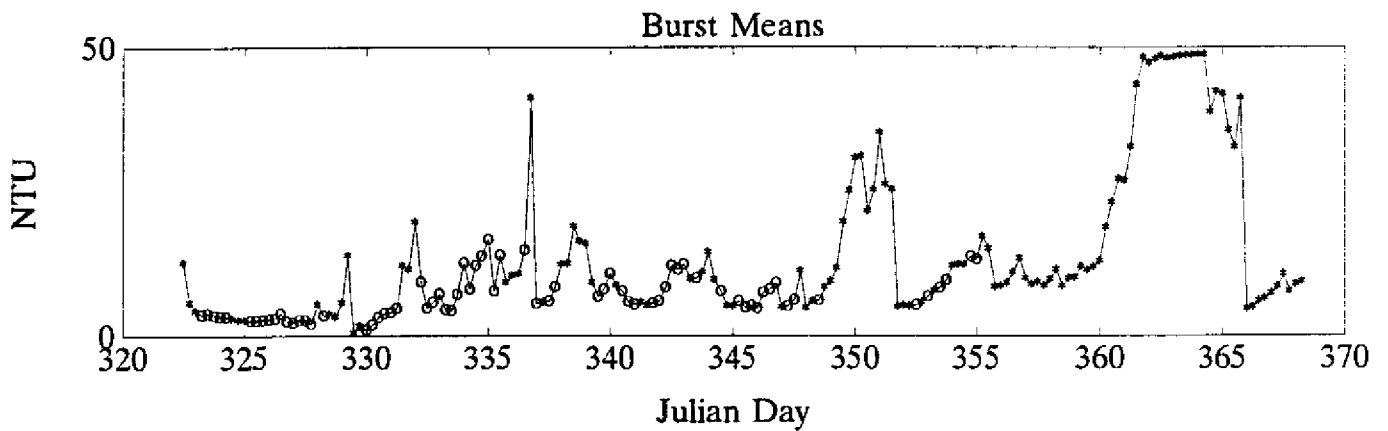
From: November 19, 1990, Julian Day - 322.5

To: January 8, 1991, Julian Day - 3.25

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H072

Sensor Elevation = 0.1m

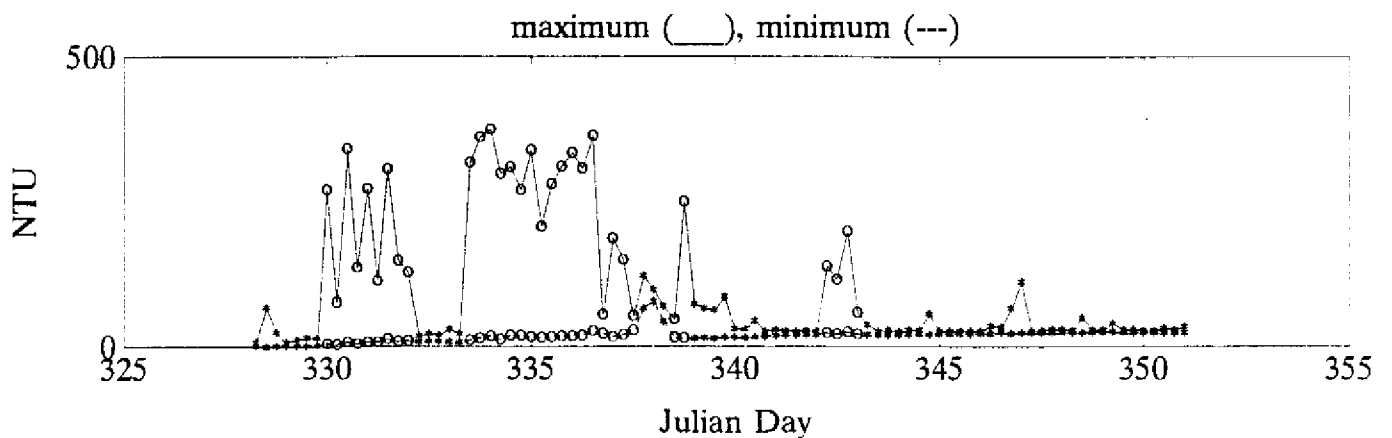
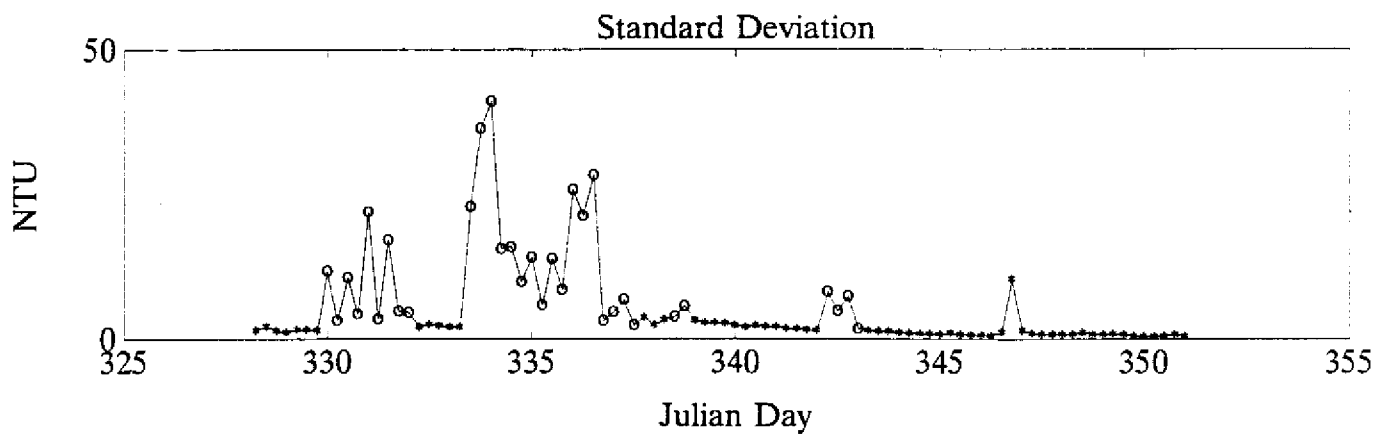
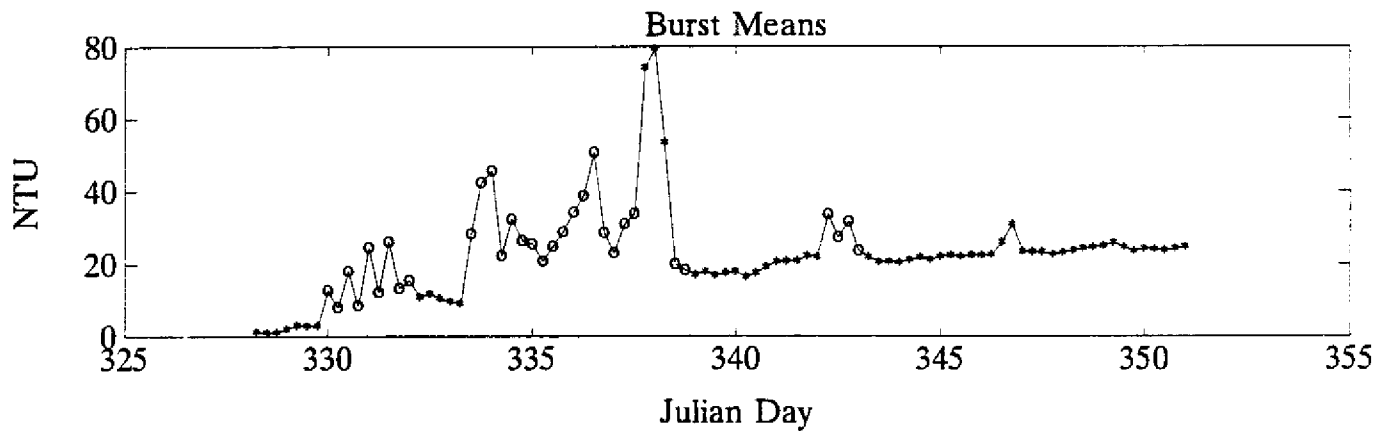
From: November 19, 1990, Julian Day - 322.5

To: December 18, 1990, Julian Day - 351.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H072

Sensor Elevation = 0.8m

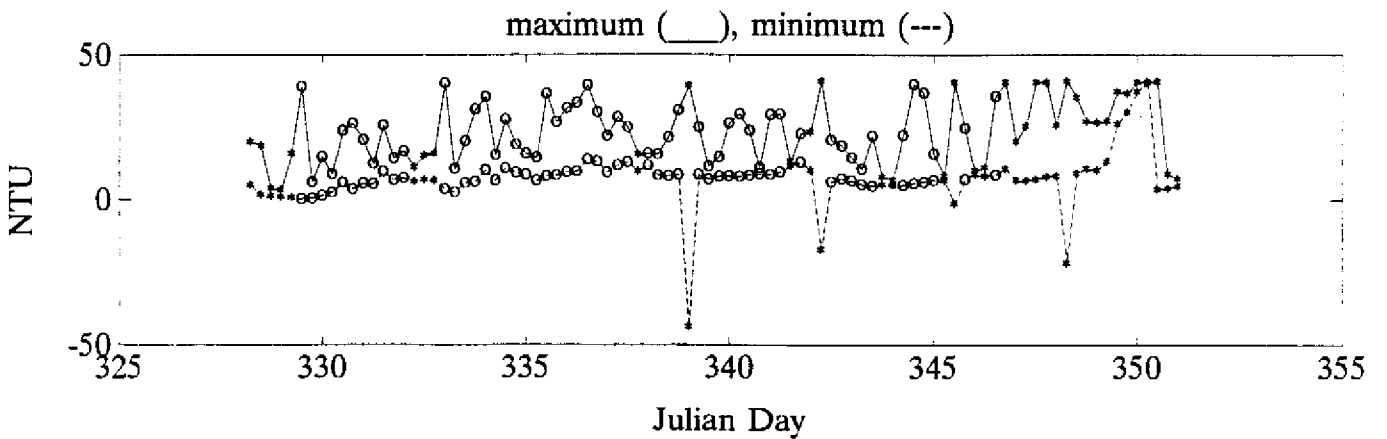
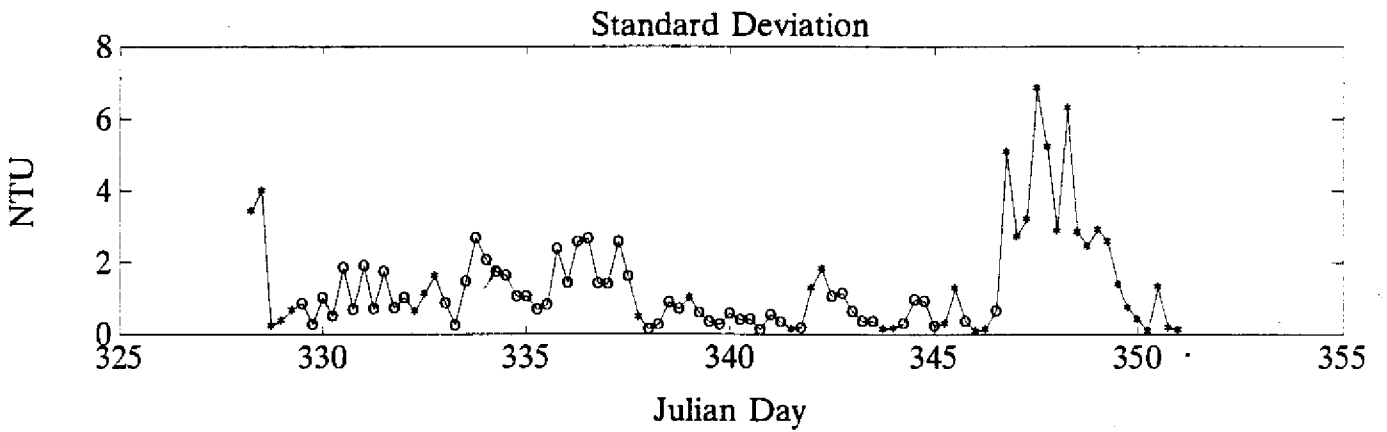
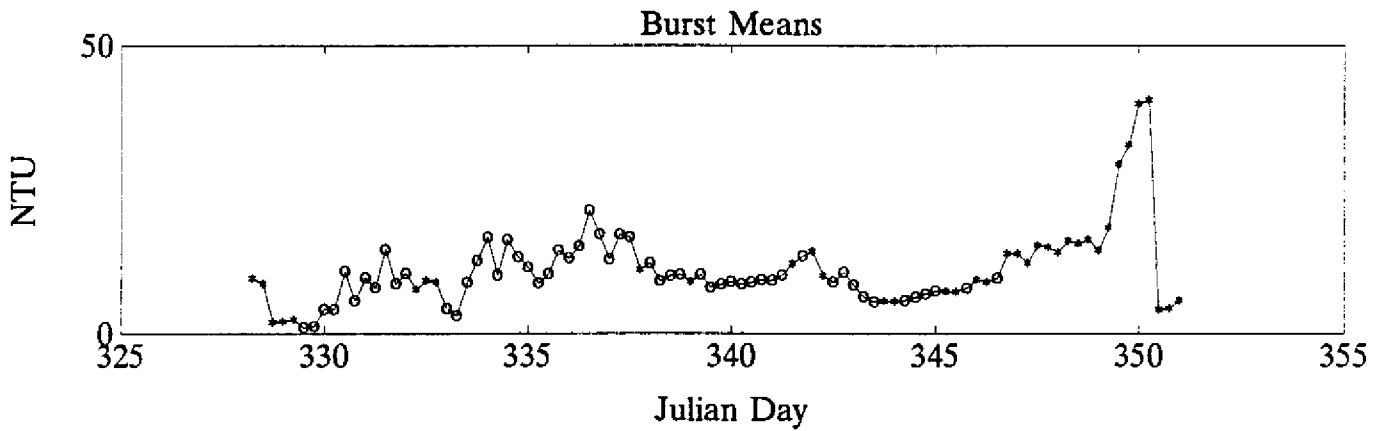
From: November 19, 1990, Julian Day - 322.5

To: December 18, 1990, Julian Day - 351.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H082

Sensor Elevation = 0.1m

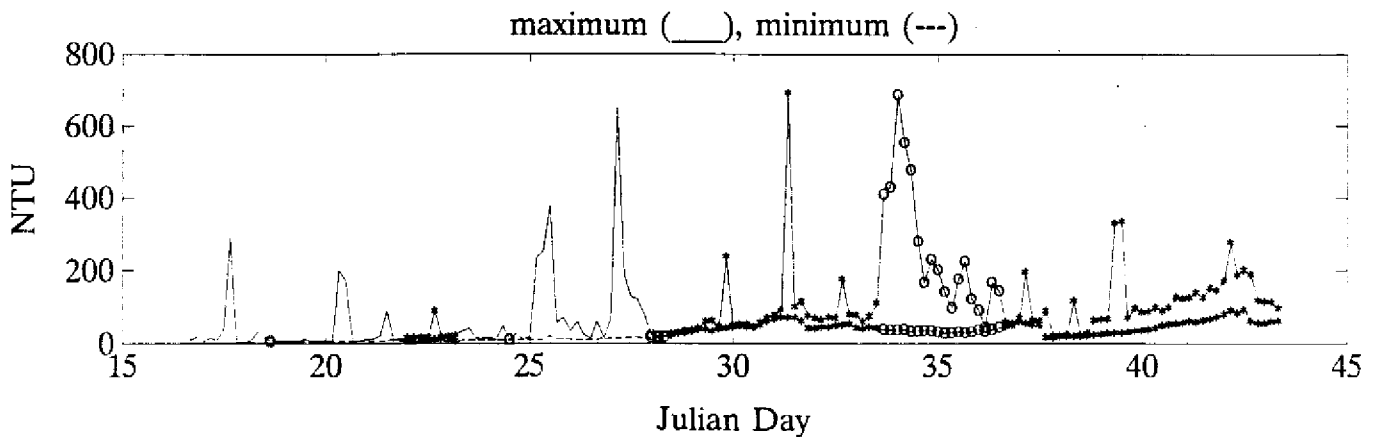
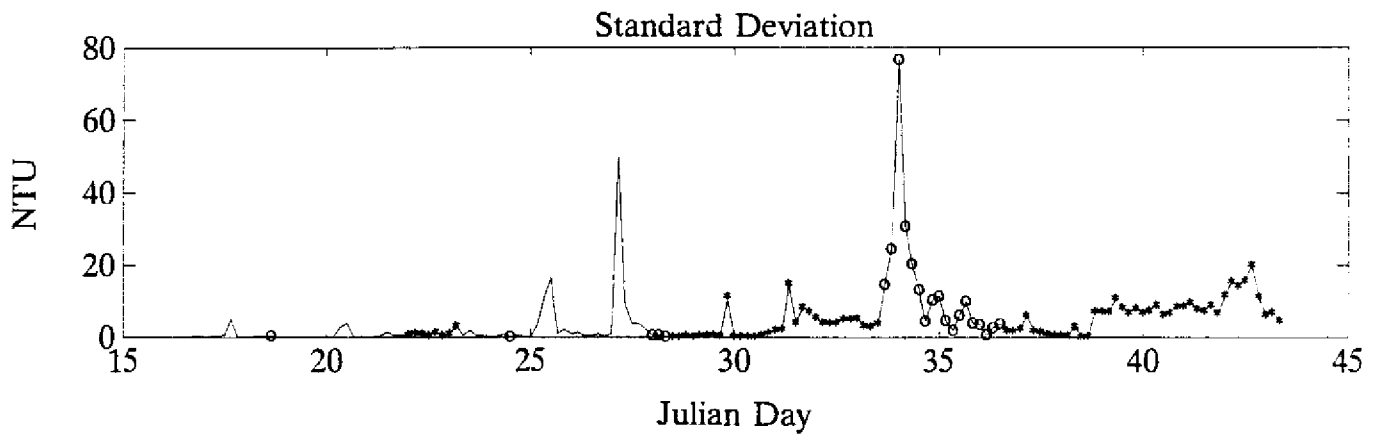
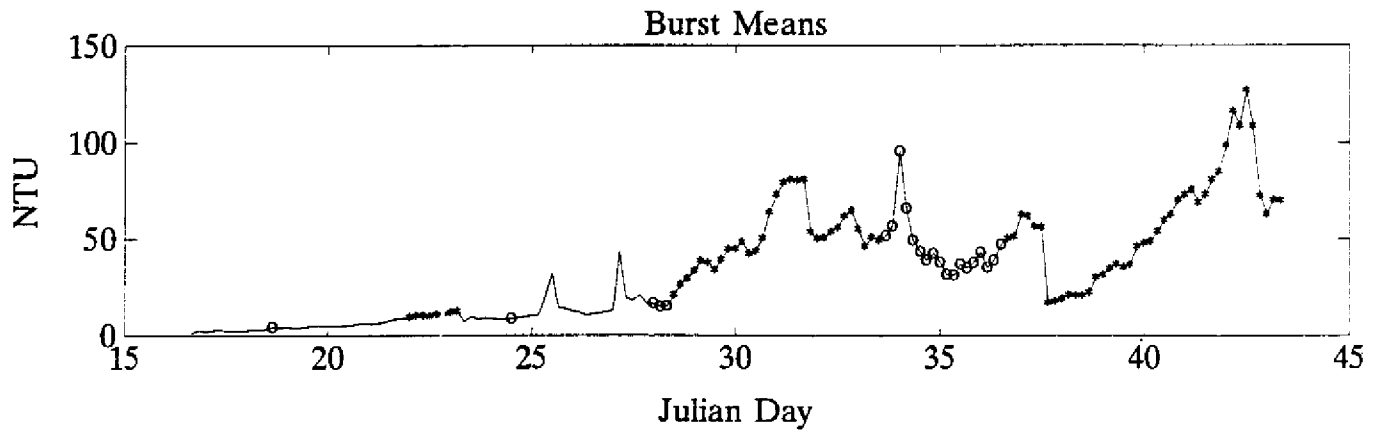
From: January 17, 1991, Julian Day - 16.0

To: February 18, 1991, Julian Day - 43.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H082

Sensor Elevation = 0.8m

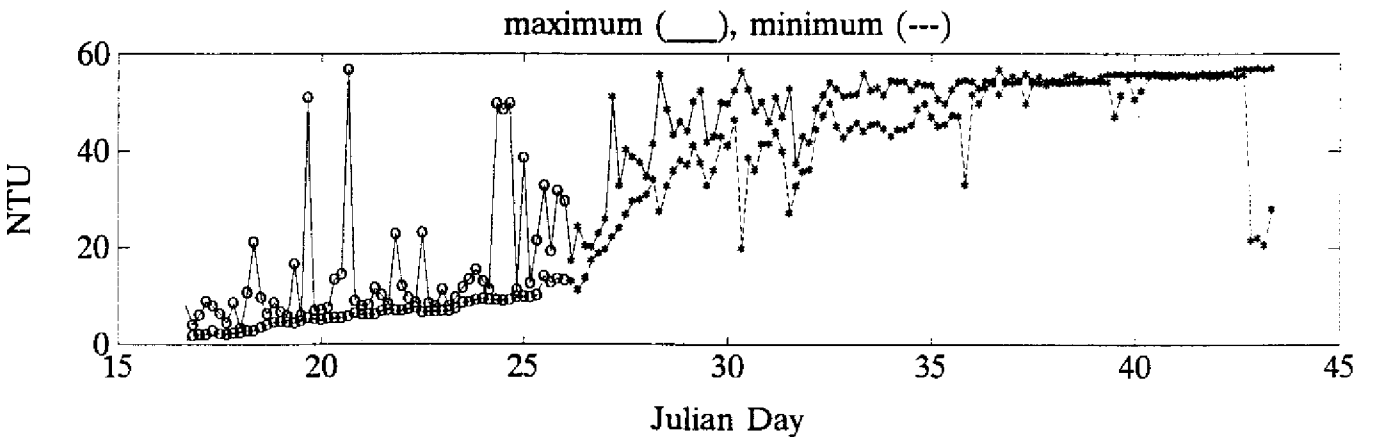
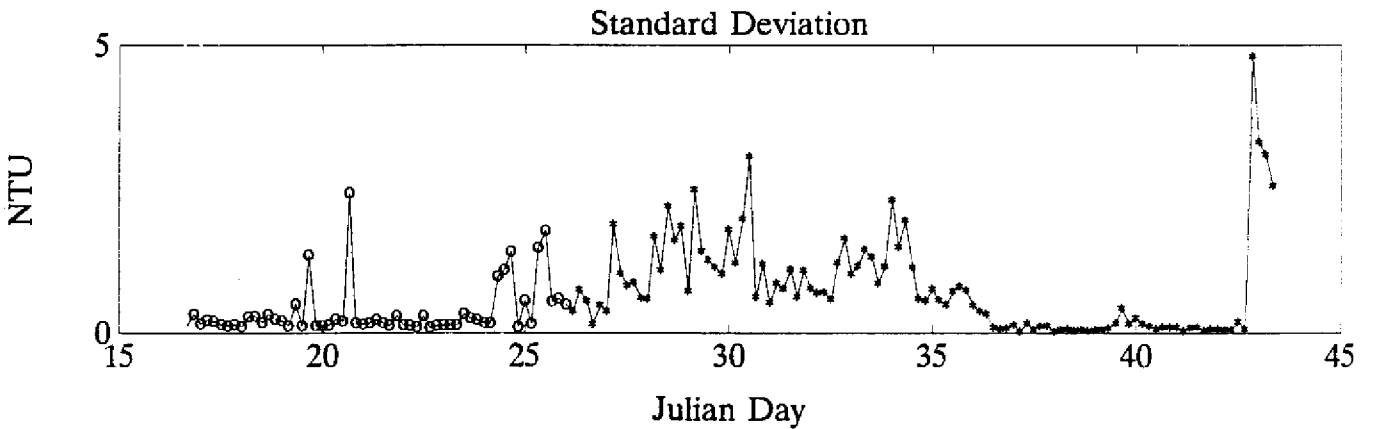
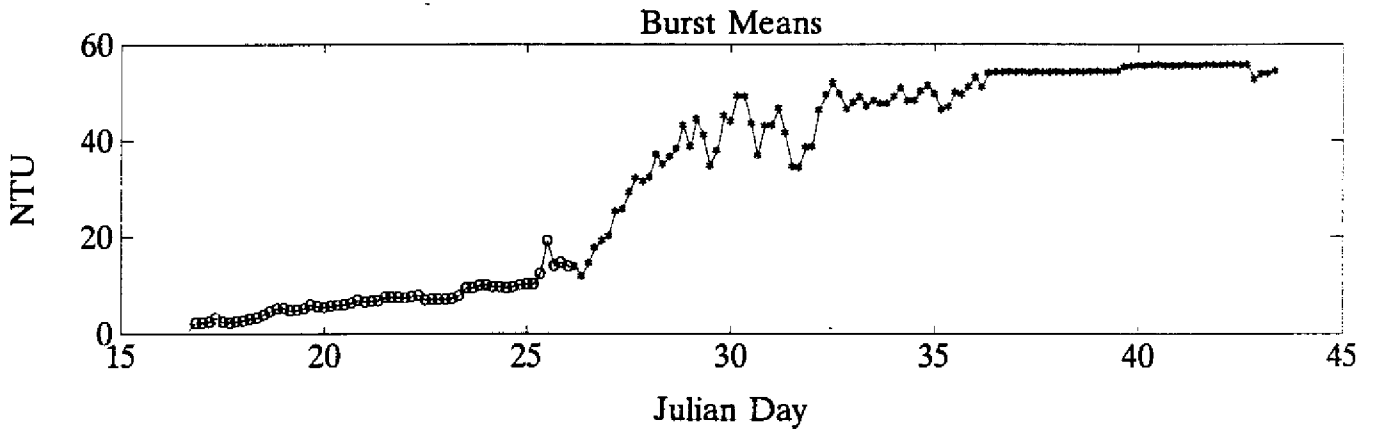
From: January 17, 1991, Julian Day - 16.0

To: February 18, 1991, Julian Day - 43.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H092

Sensor Elevation = 0.1m

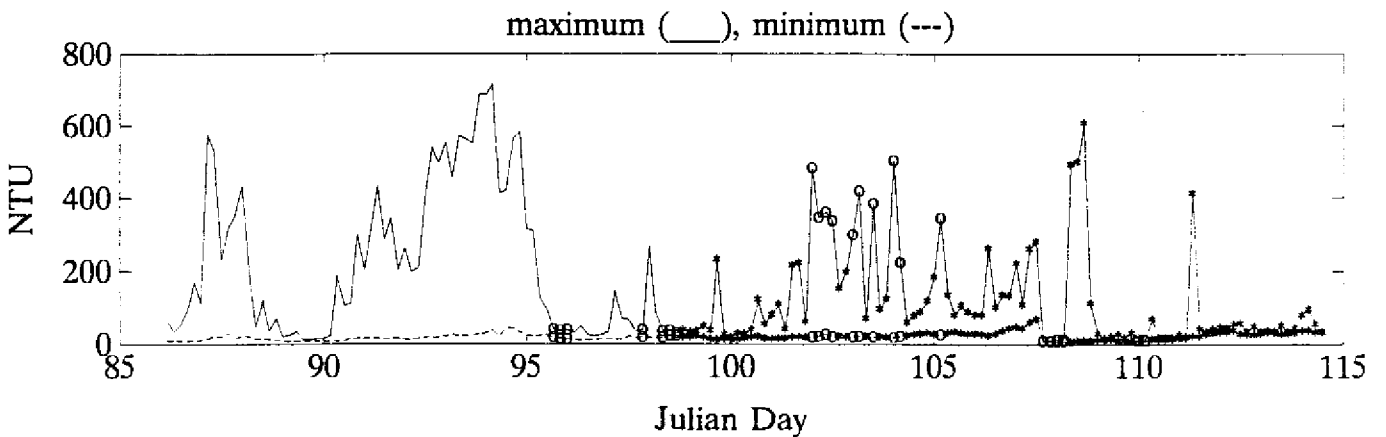
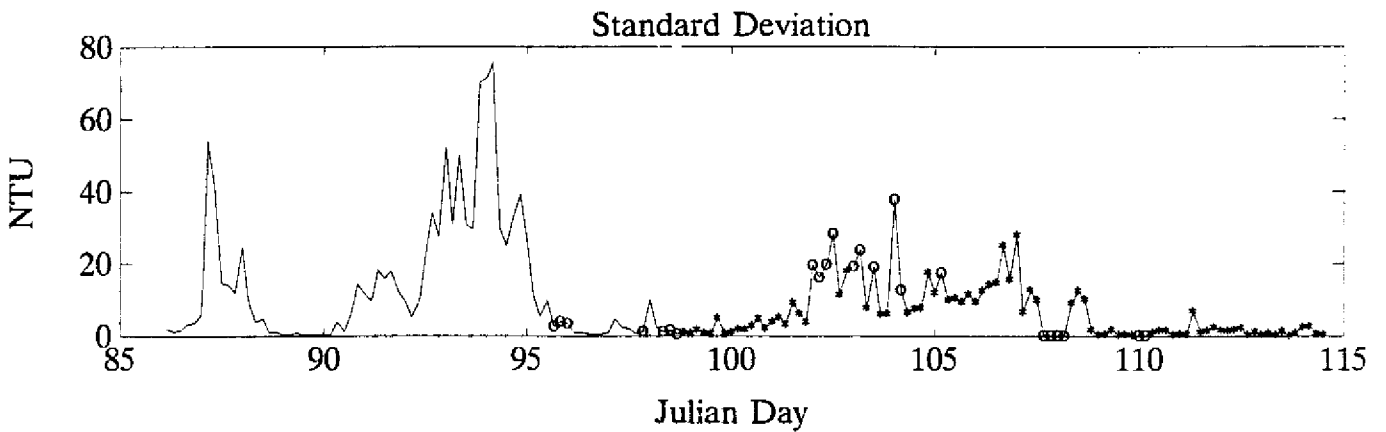
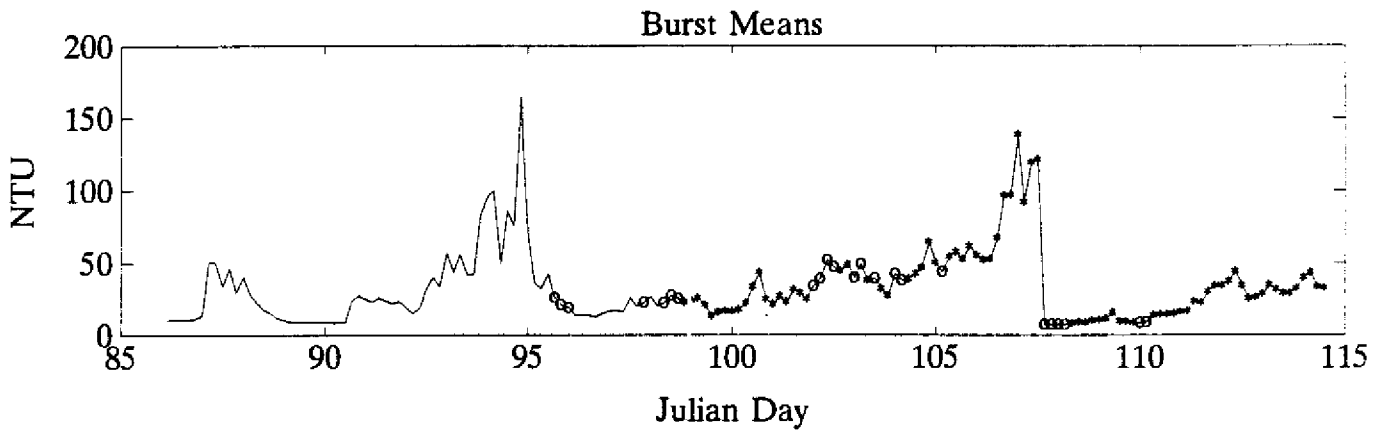
From: March 26, 1991, Julian Day - 84.16

To: April 25, 1991, Julian Day - 114.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H092

Sensor Elevation = 0.75m

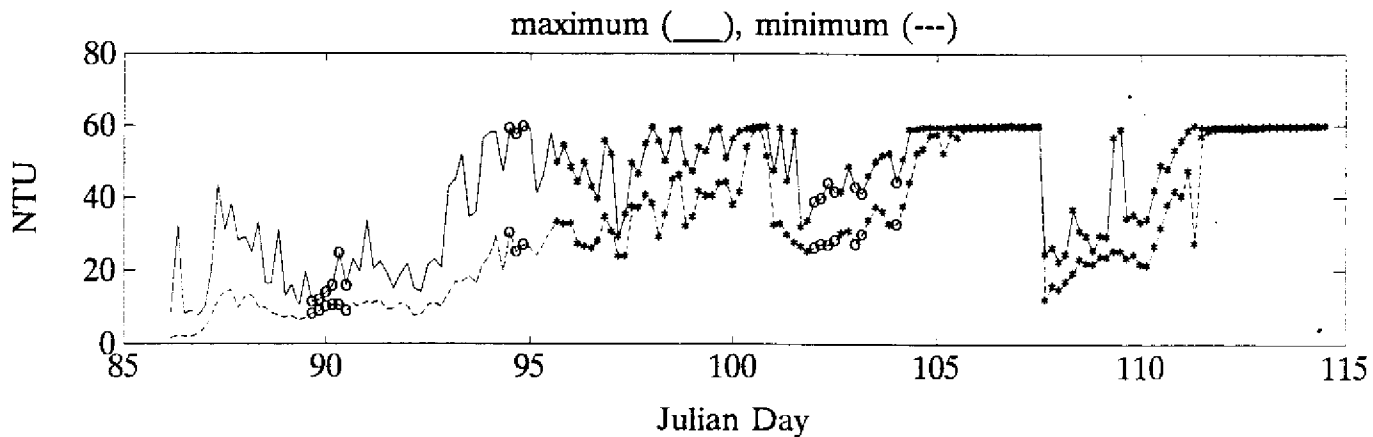
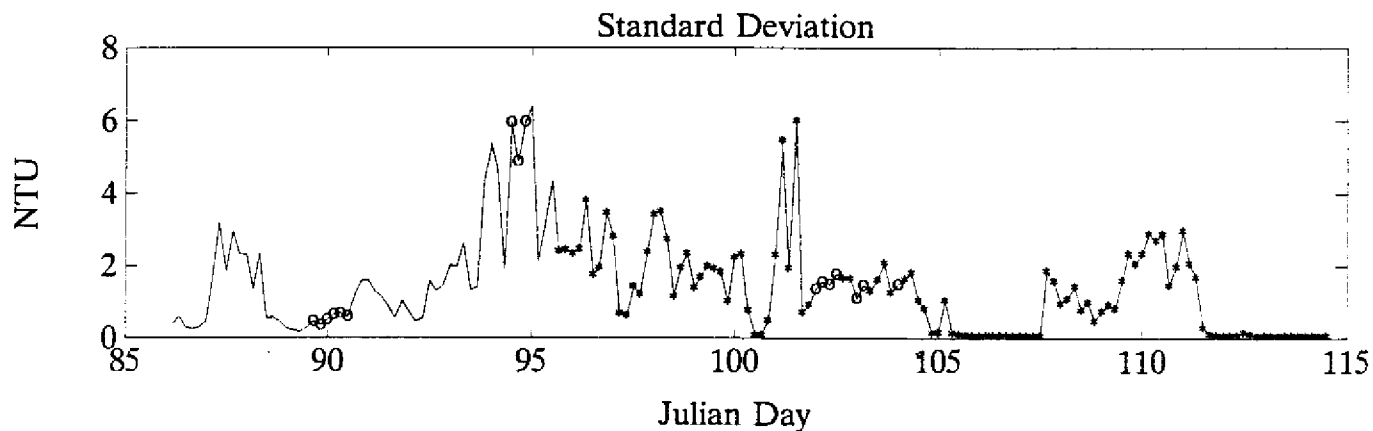
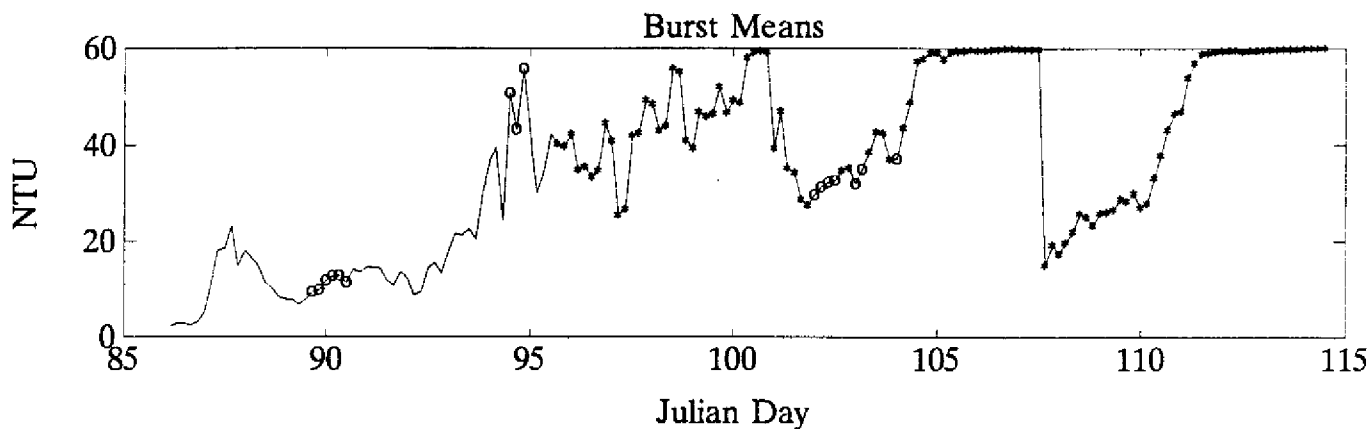
From: March 26, 1991, Julian Day - 84.16

To: April 25, 1991, Julian Day - 114.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H101

Sensor Elevation = 0.6m

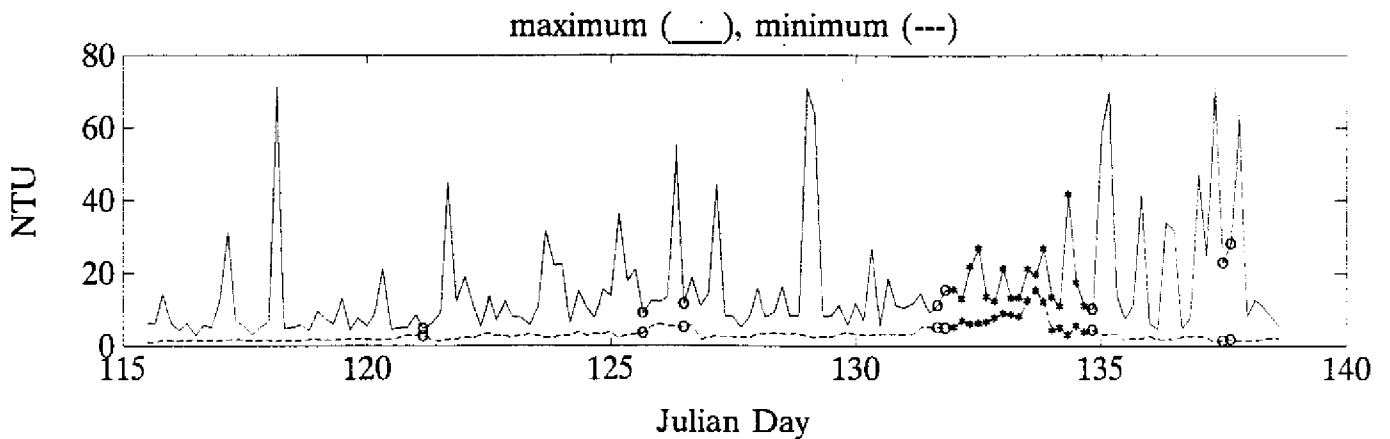
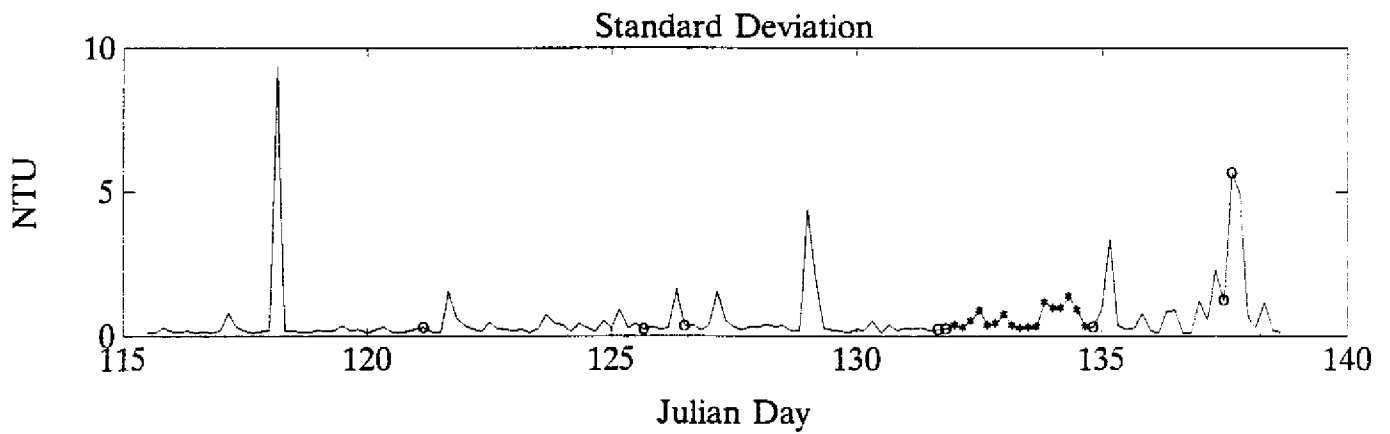
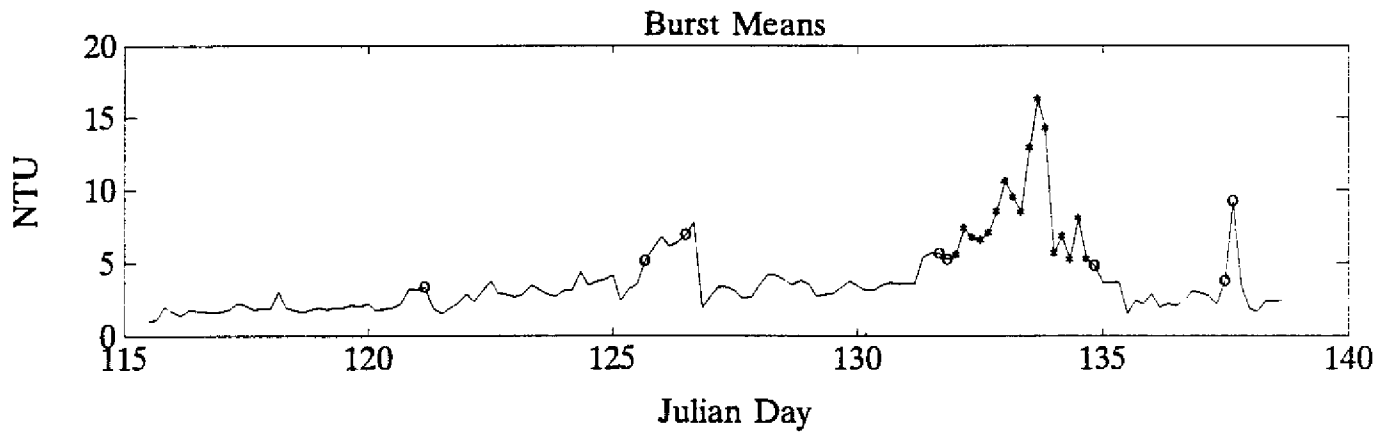
From: April 26, 1991, Julian Day - 115.5

To: May 19, 1991, Julian Day - 138.7

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H102

Sensor Elevation = 0.1m

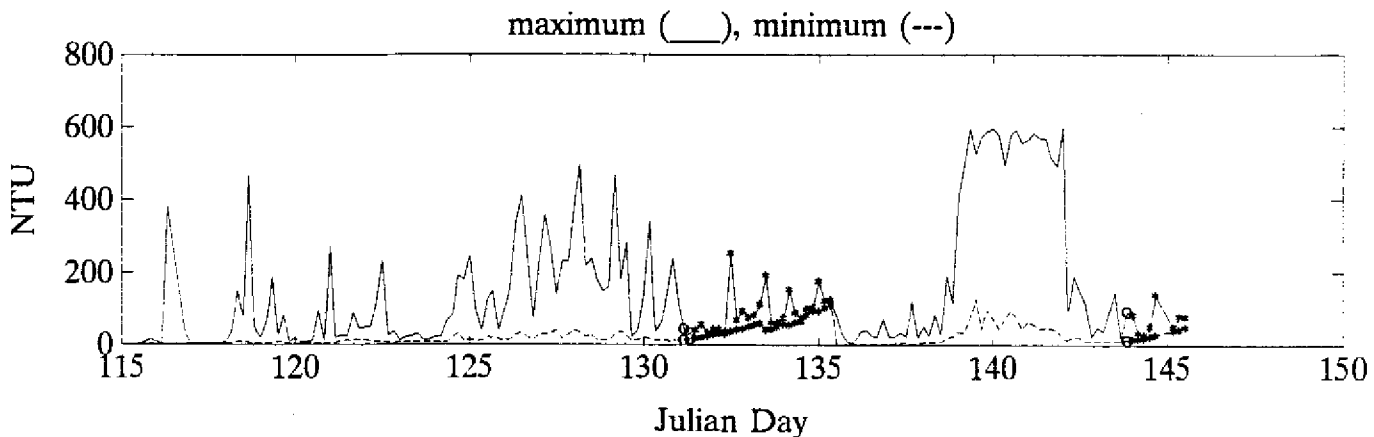
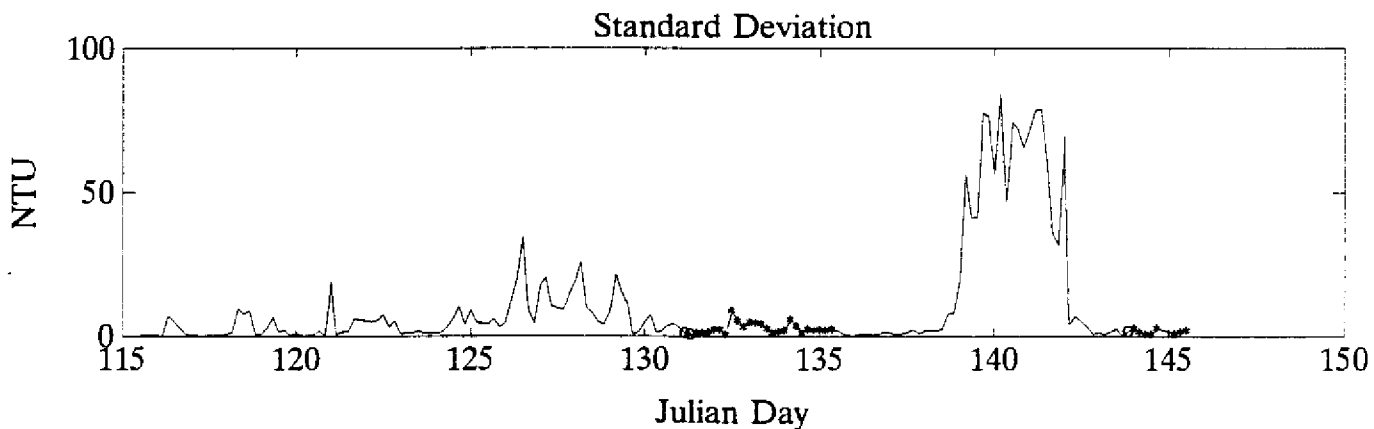
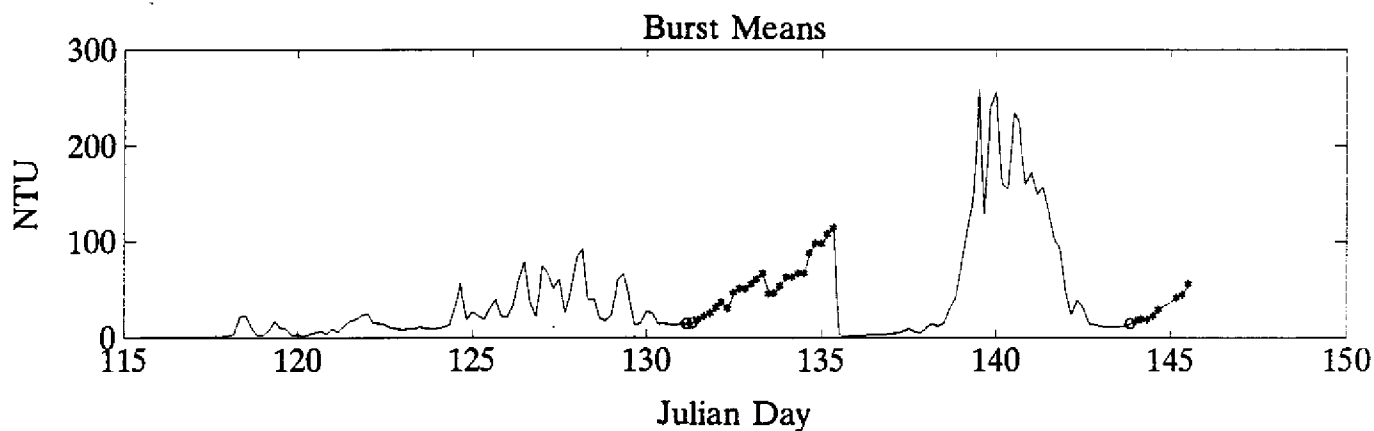
From: April 26, 1991, Julian Day - 115.5

To: May 26, 1991, Julian Day - 145.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H111

Sensor Elevation = 0.5m

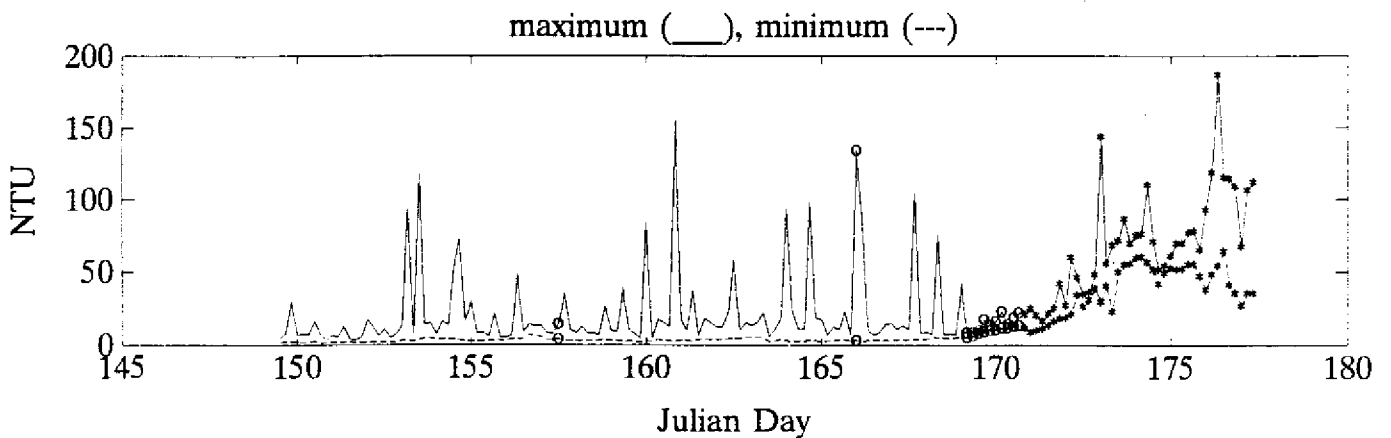
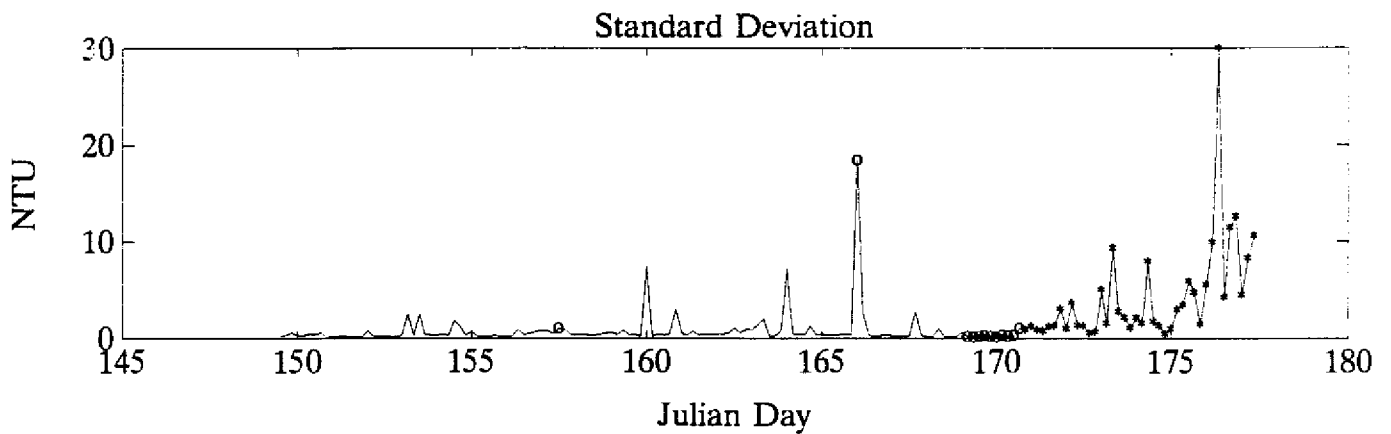
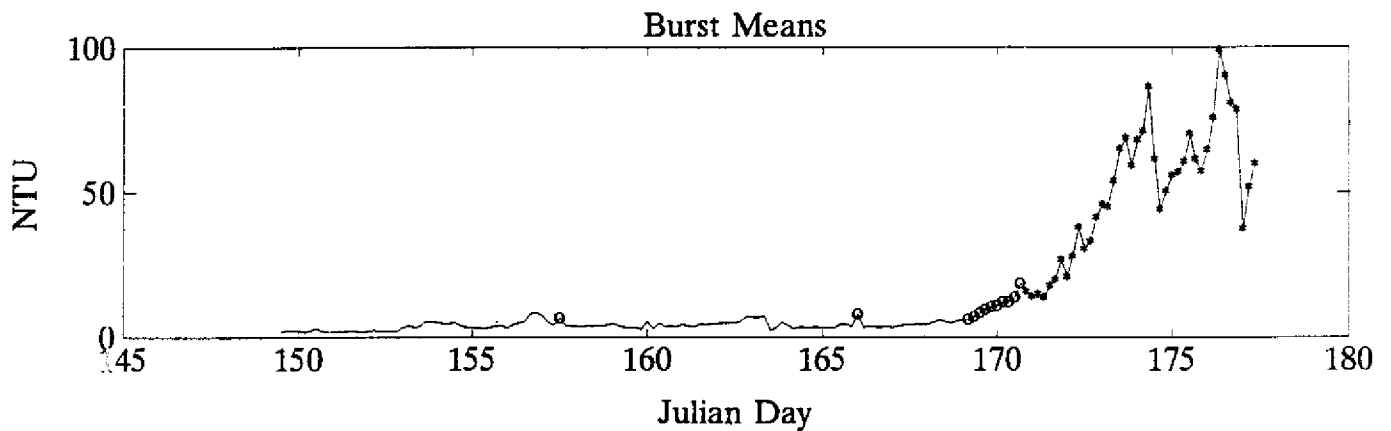
From: May 30, 1991, Julian Day - 149.5

To: June 27, 1991, Julian Day - 177.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H112

Sensor Elevation = 0.8m

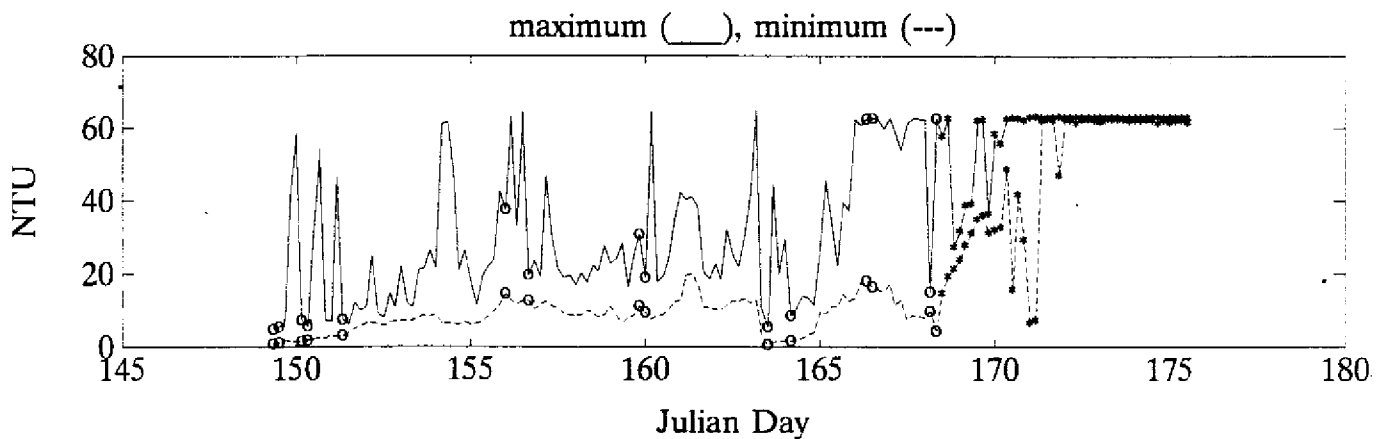
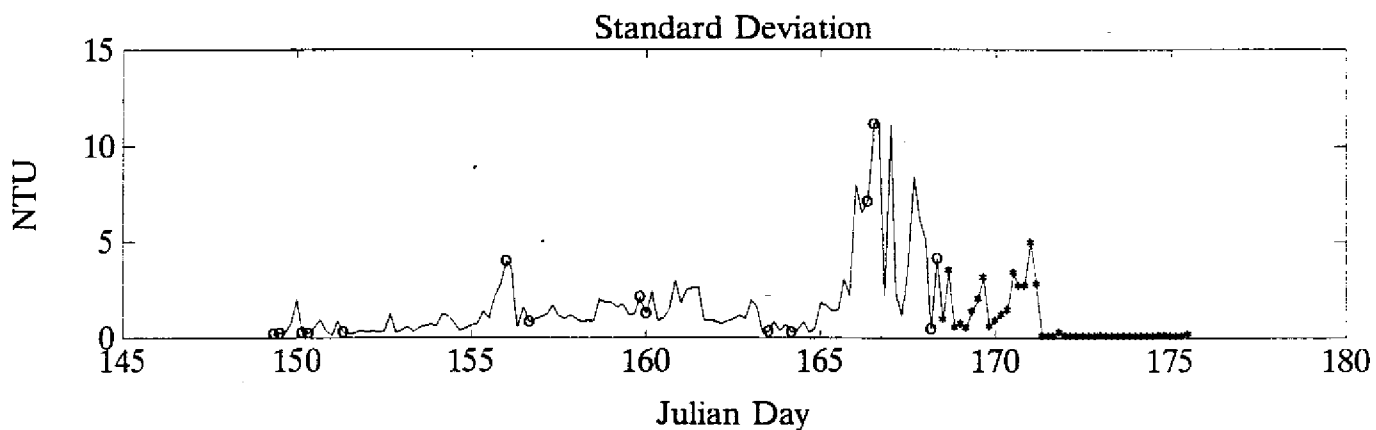
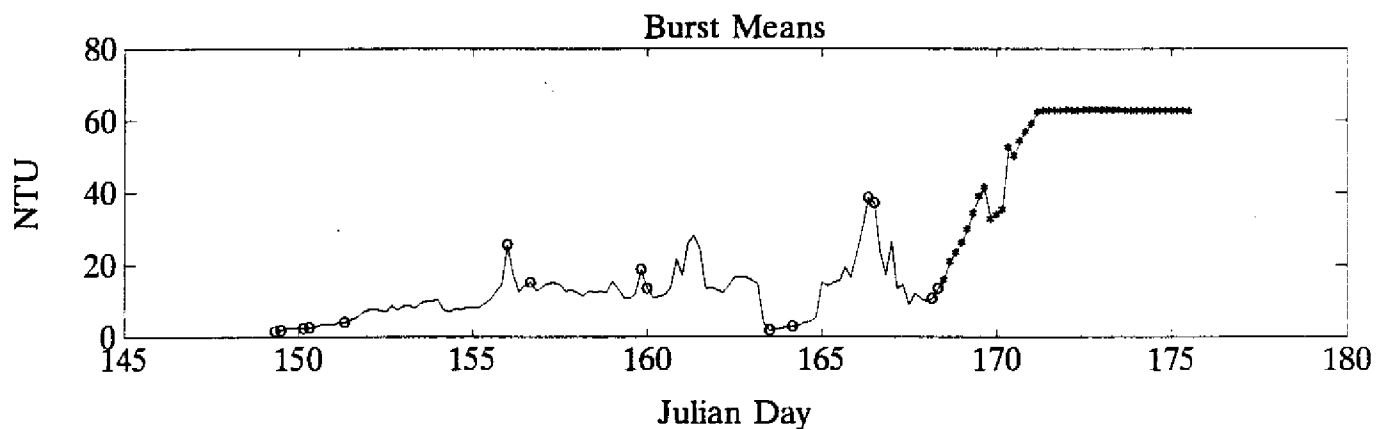
From: May 30, 1991, Julian Day - 149.5

To: June 25, 1991, Julian Day - 175.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H121

Sensor Elevation = 0.5m

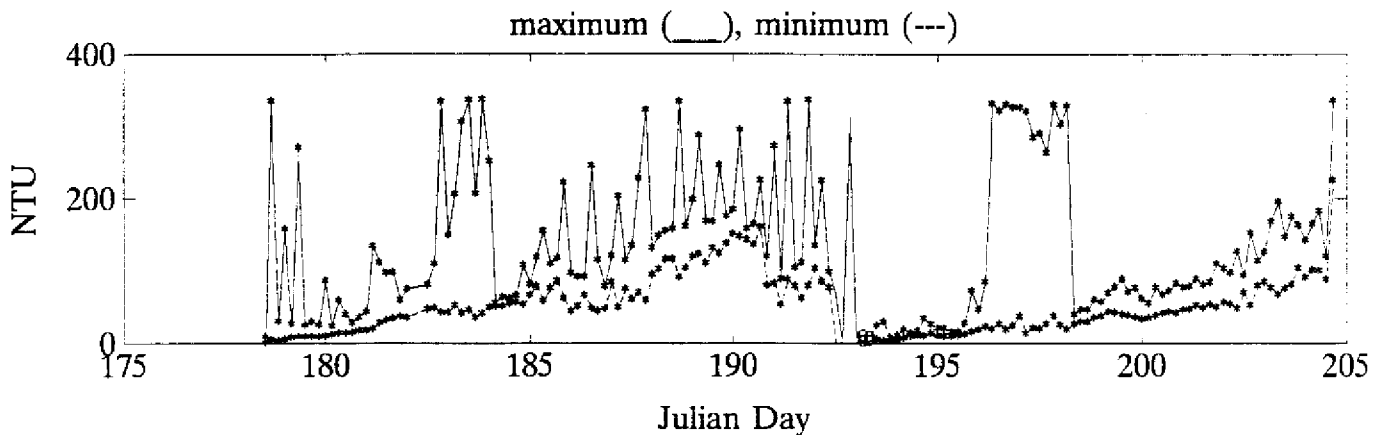
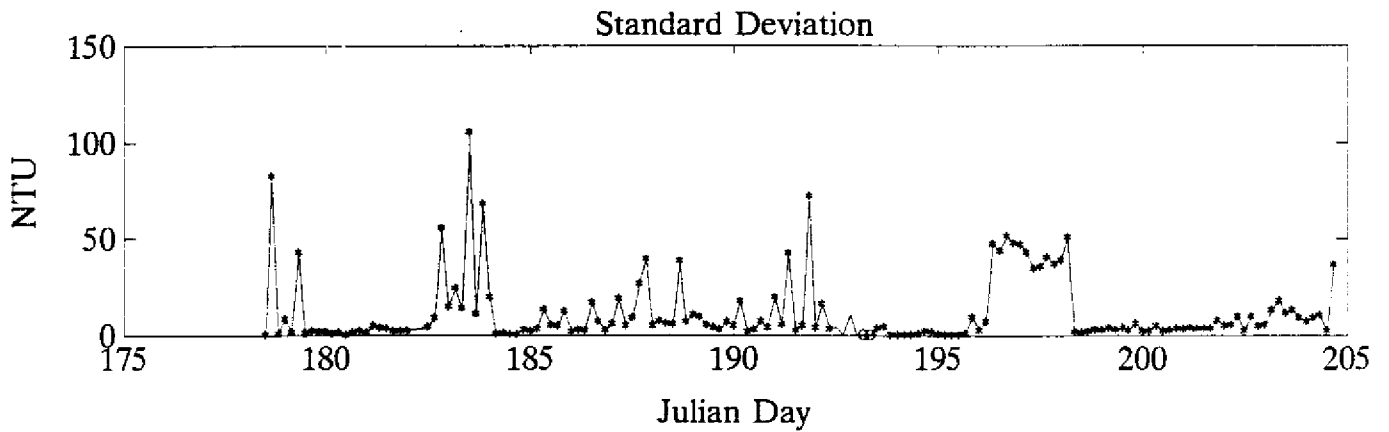
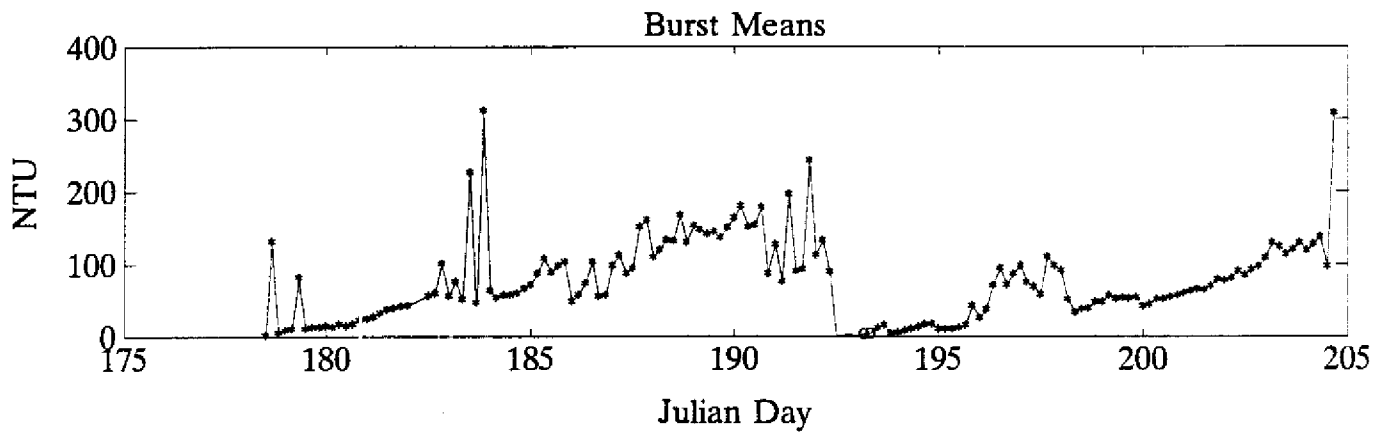
From: June 28, 1991, Julian Day - 178.5

To: July 24, 1991, Julian Day - 204.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H121

Sensor Elevation = 0.85m

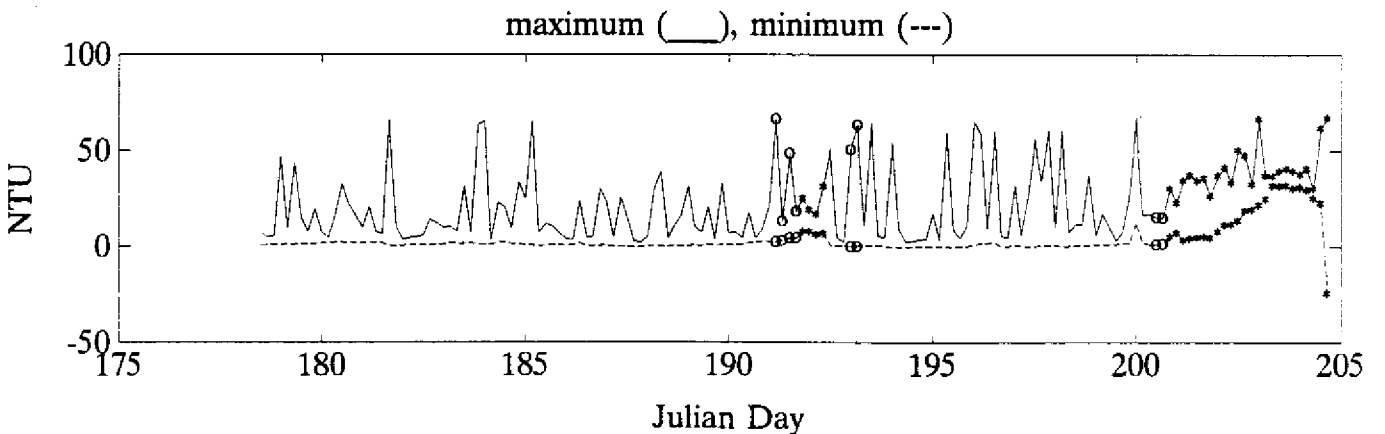
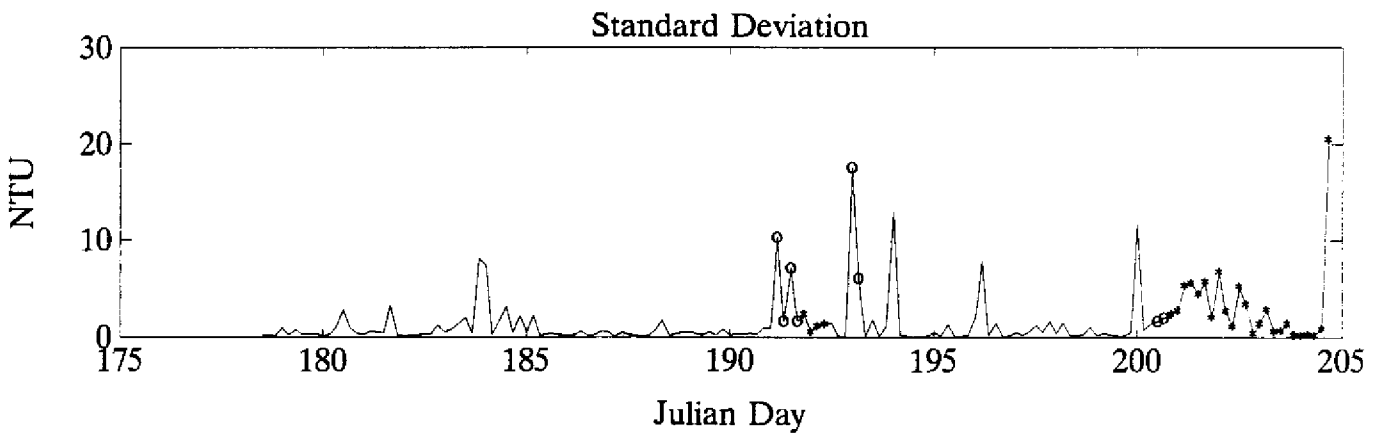
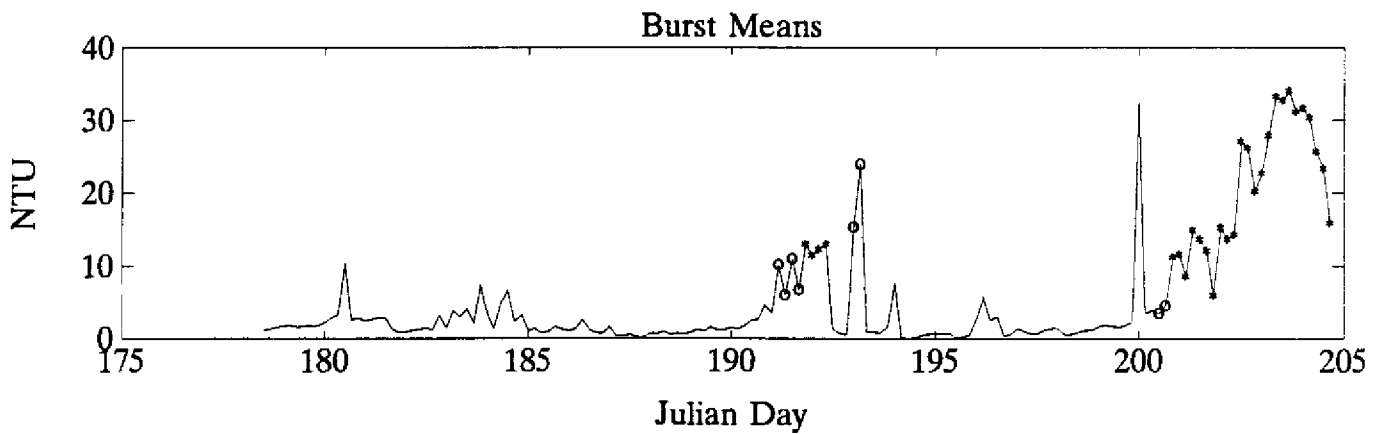
From: June 28, 1991, Julian Day - 178.5

To: July 24, 1991, Julian Day - 204.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H122

Sensor Elevation = 0.1m

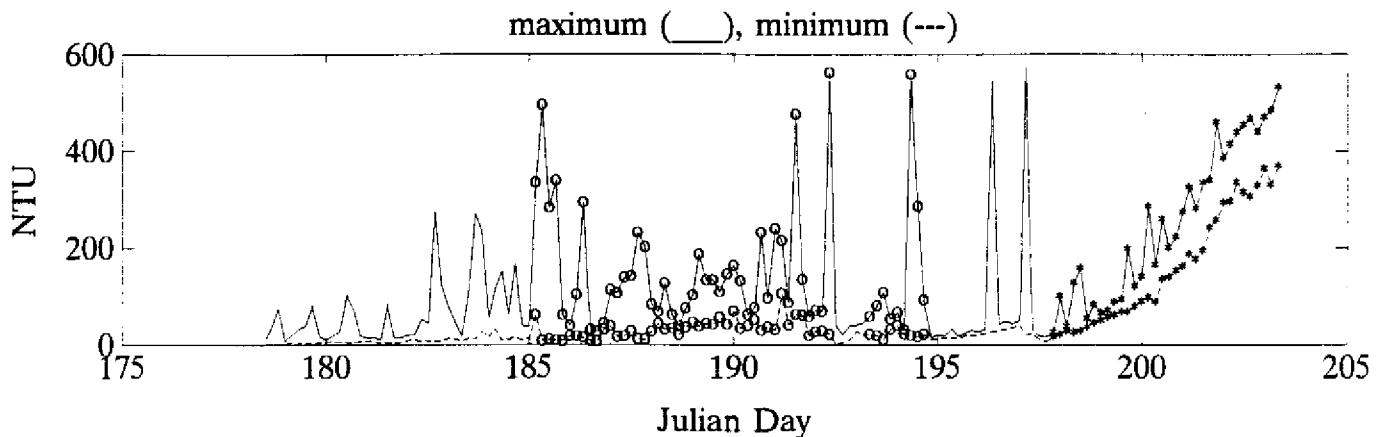
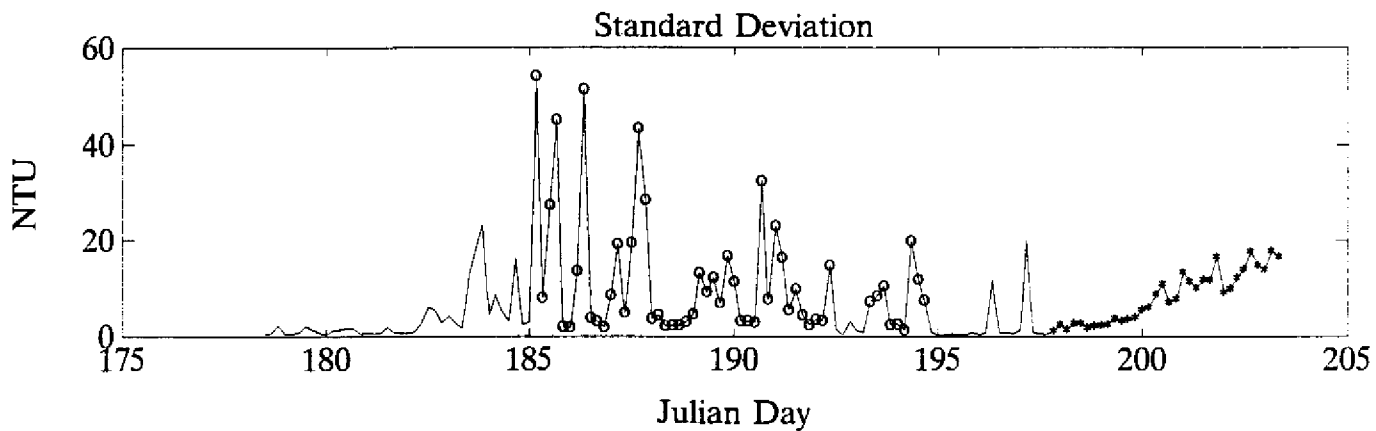
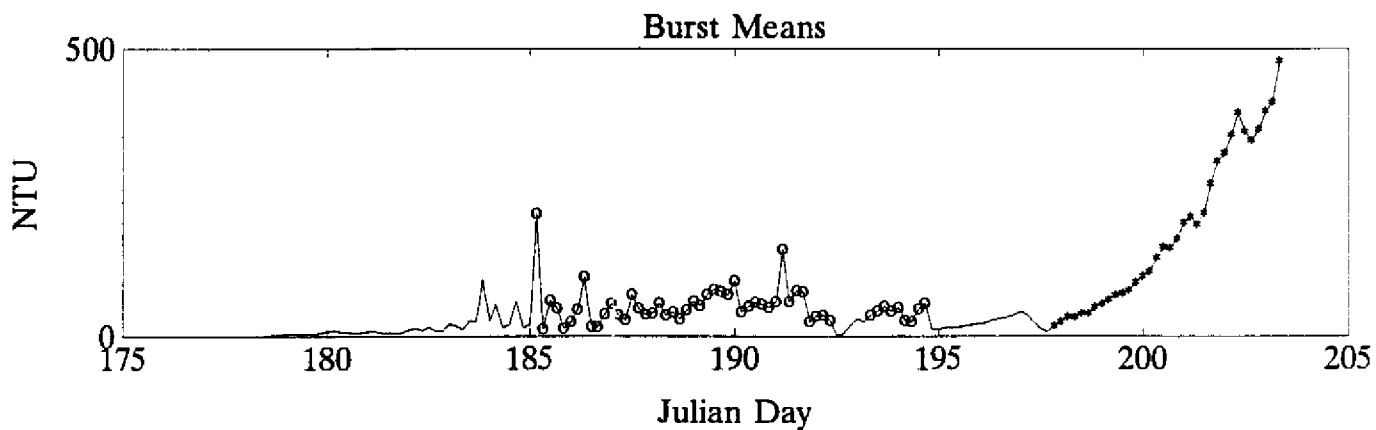
From: June 28, 1991, Julian Day - 178.5

To: July 24, 1991, Julian Day - 204.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H122

Sensor Elevation = 0.7m

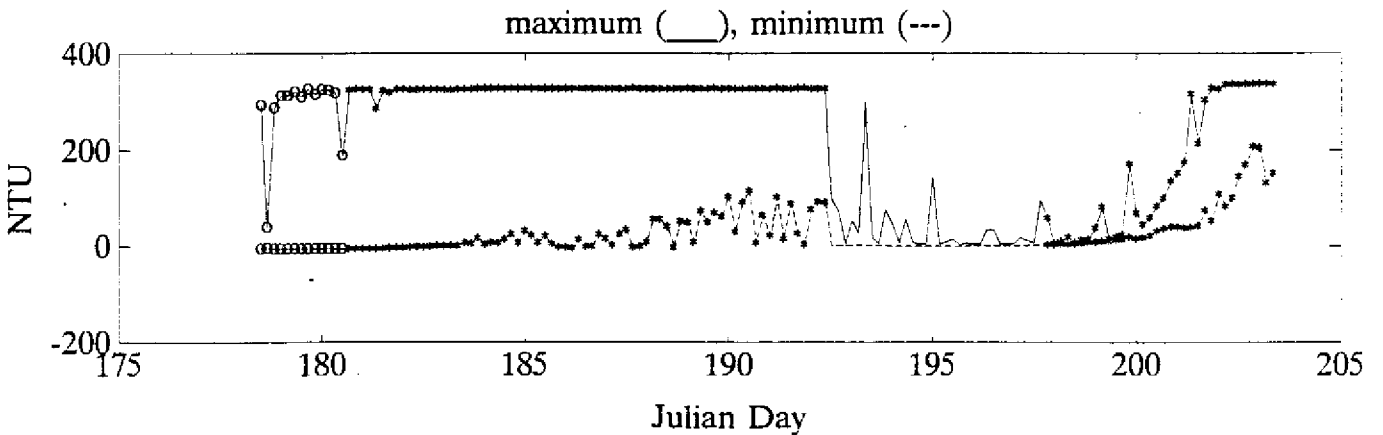
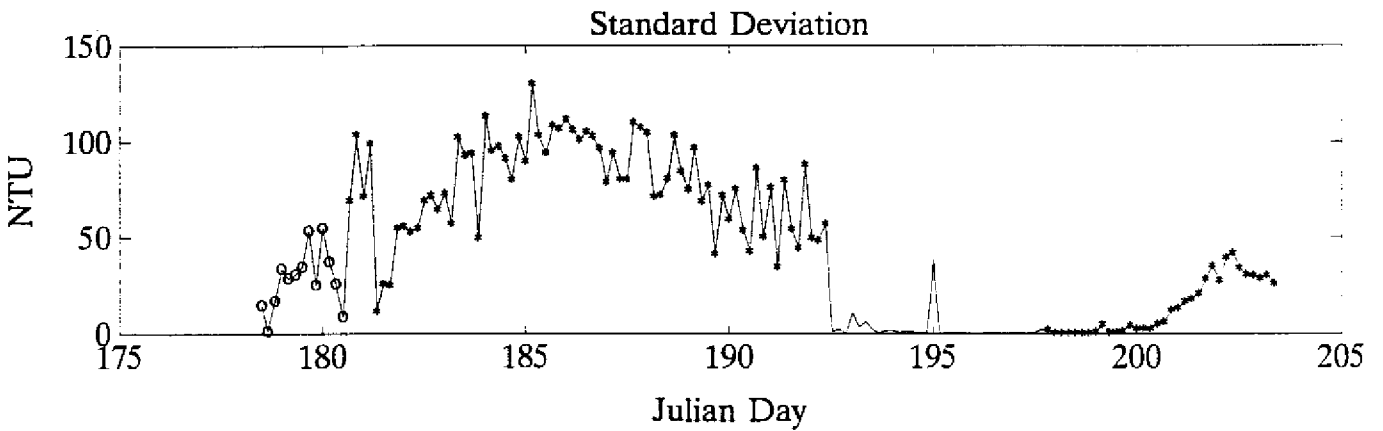
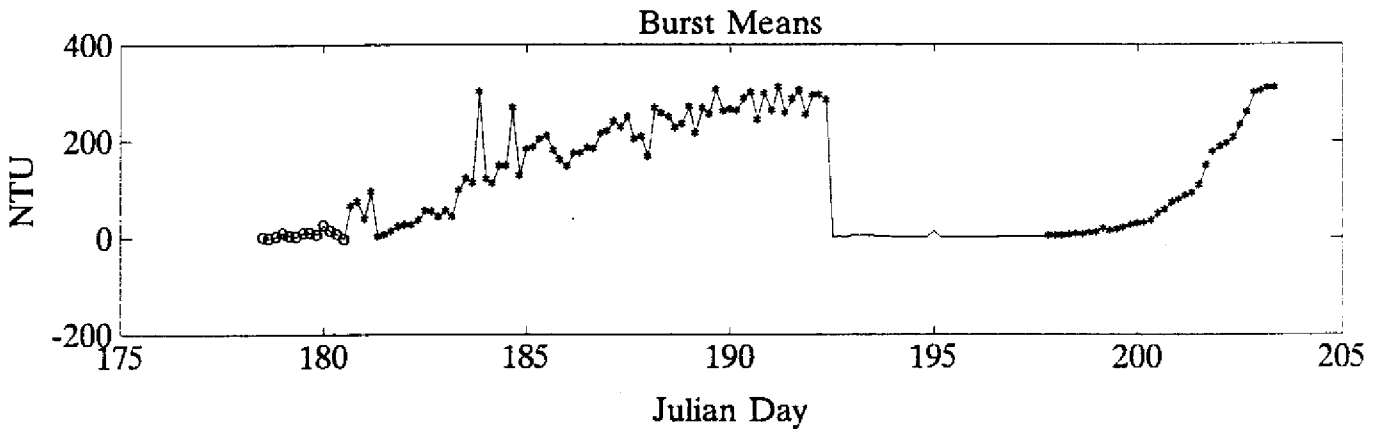
From: June 28, 1991, Julian Day - 178.5

To: July 24, 1991, Julian Day - 204.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H131

Sensor Elevation = 0.5m

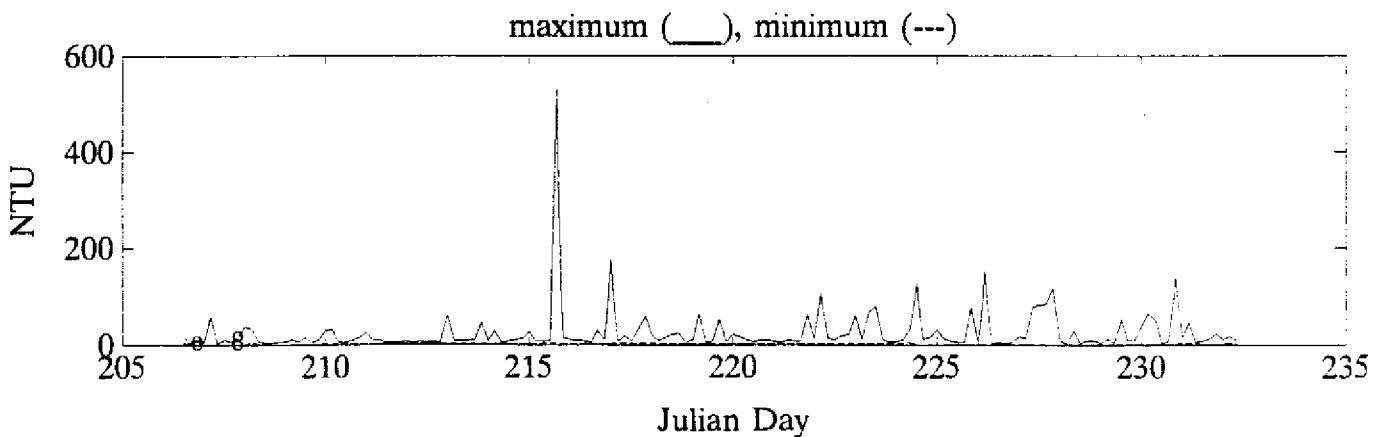
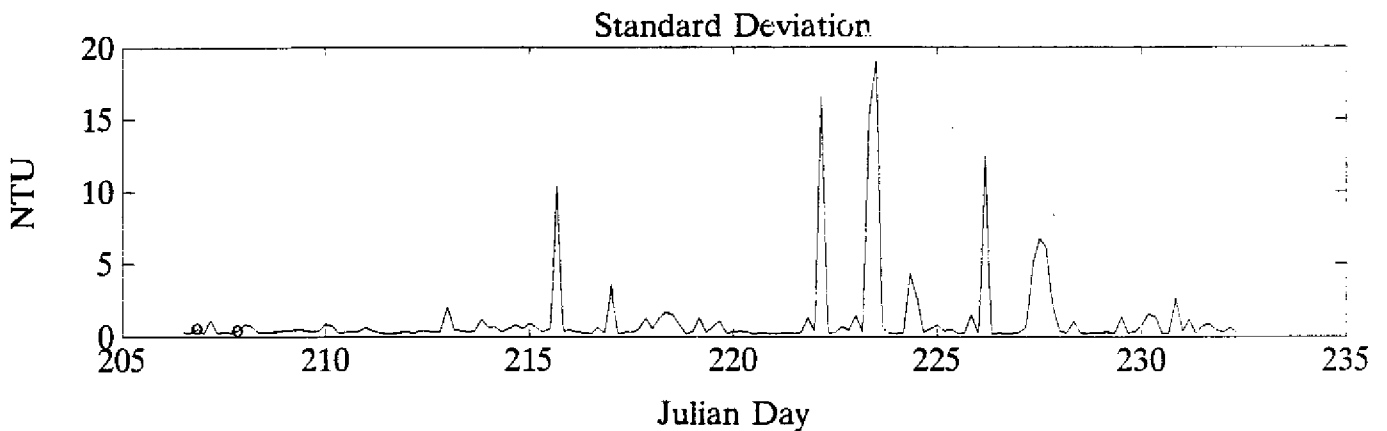
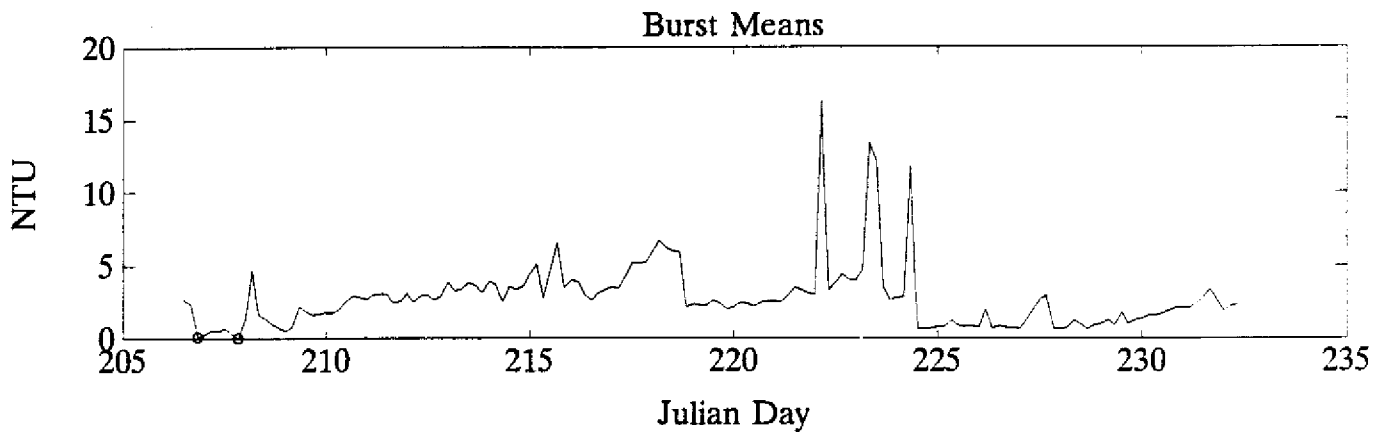
From: July 26, 1991, Julian Day - 206.5

To: August 21, 1991, Julian Day - 232.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H131

Sensor Elevation = 0.85m

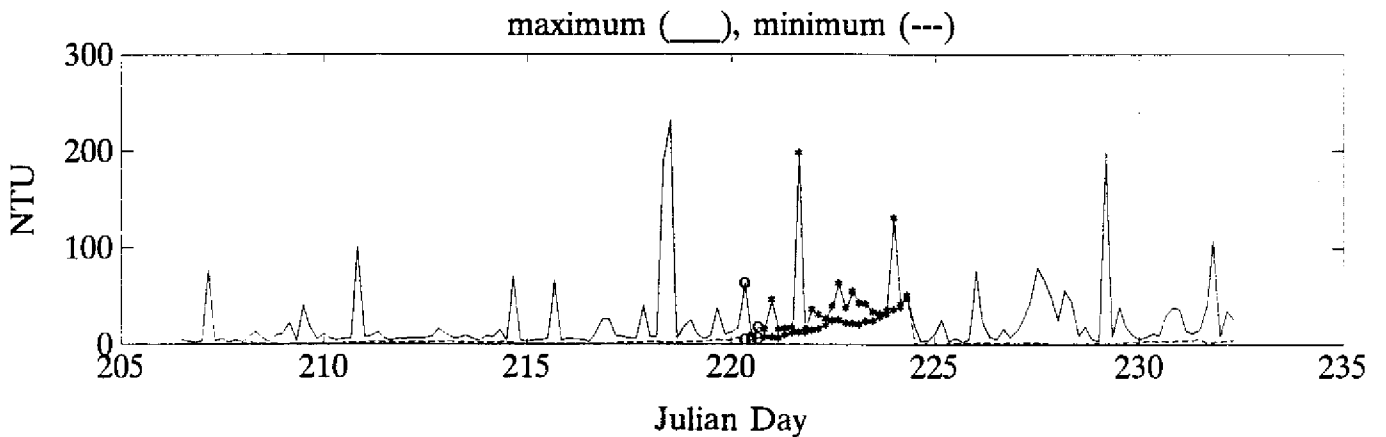
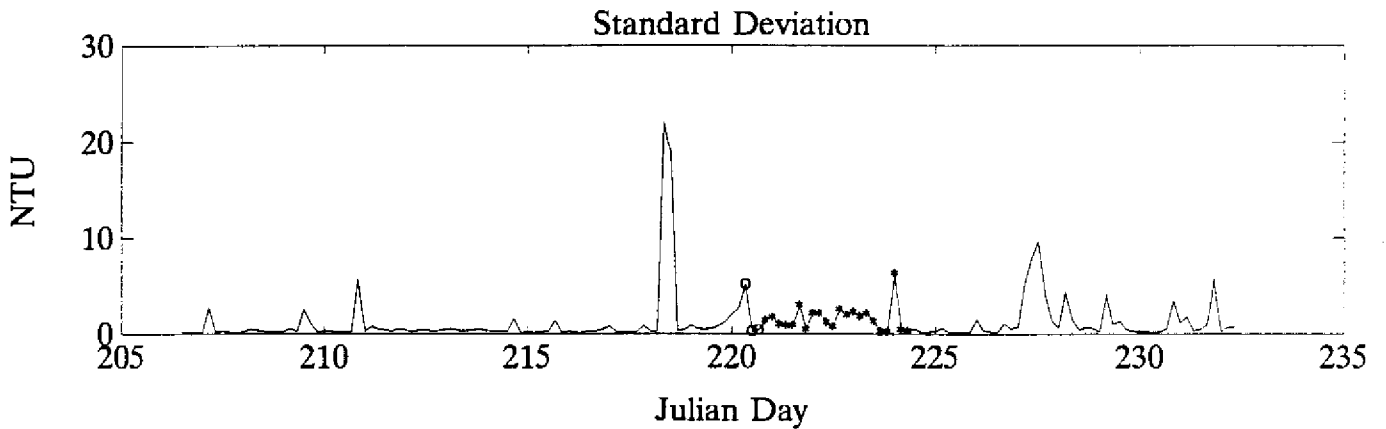
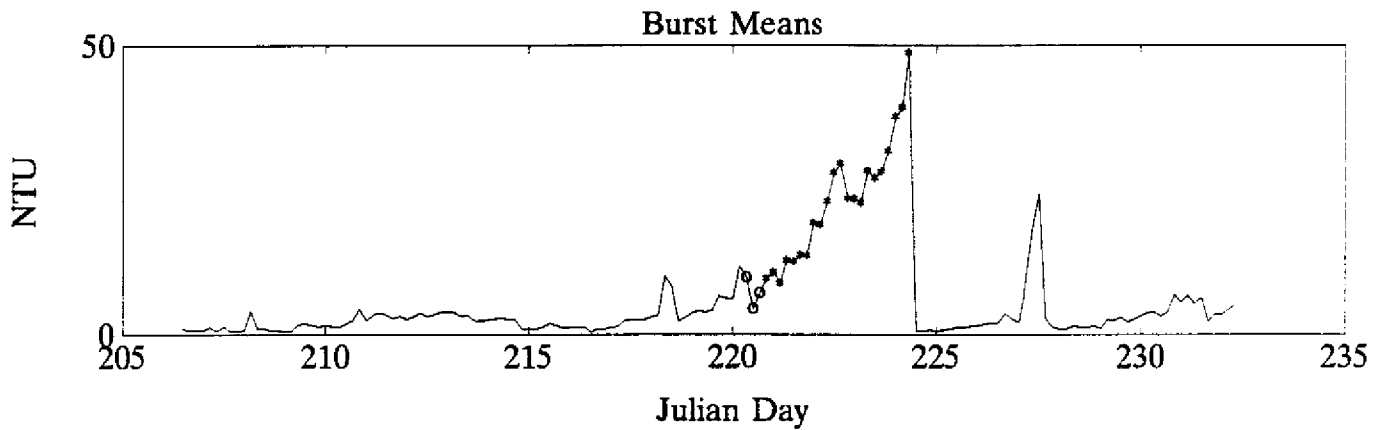
From: July 26, 1991, Julian Day - 206.5

To: August 21, 1991, Julian Day - 232.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H132

Sensor Elevation = 0.1m

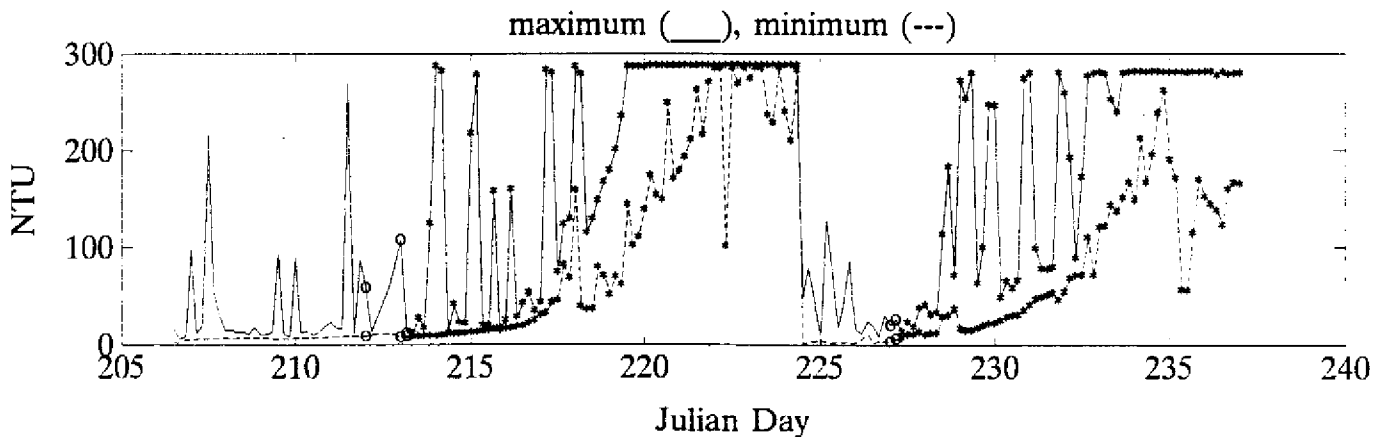
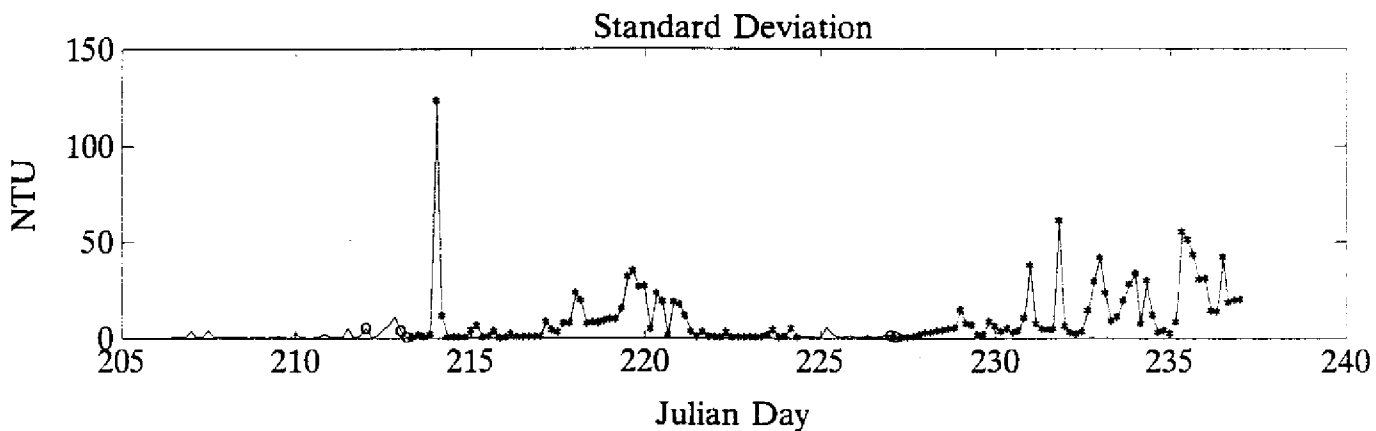
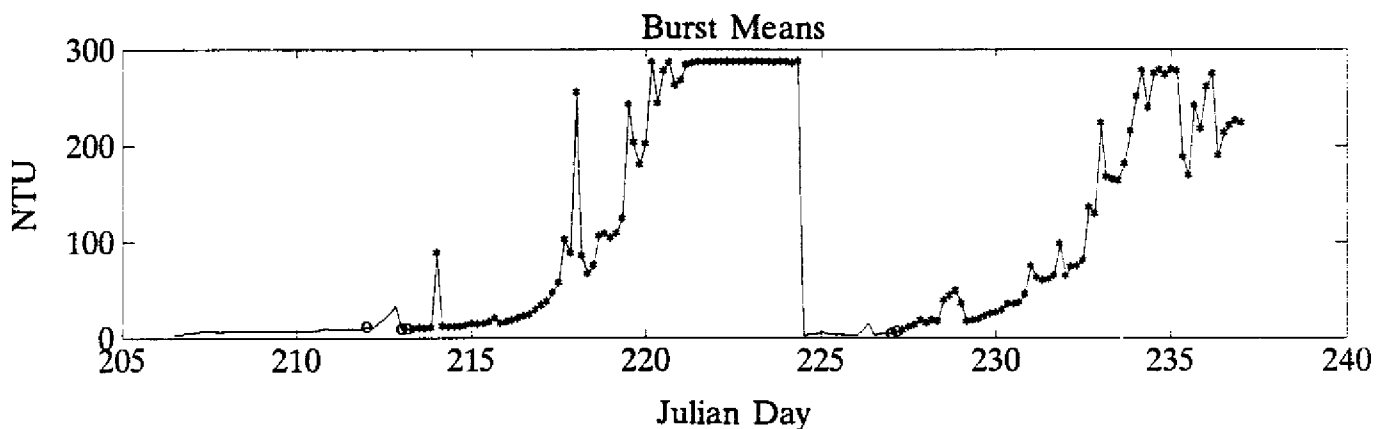
From: July 26, 1991, Julian Day - 206.5

To: August 26, 1991, Julian Day - 237.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H132

Sensor Elevation = 0.8m

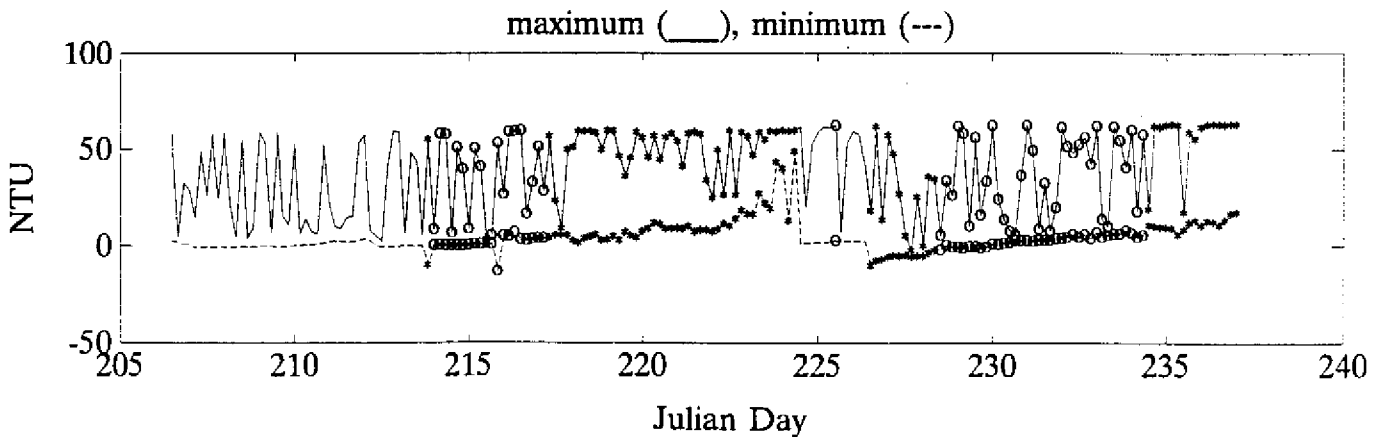
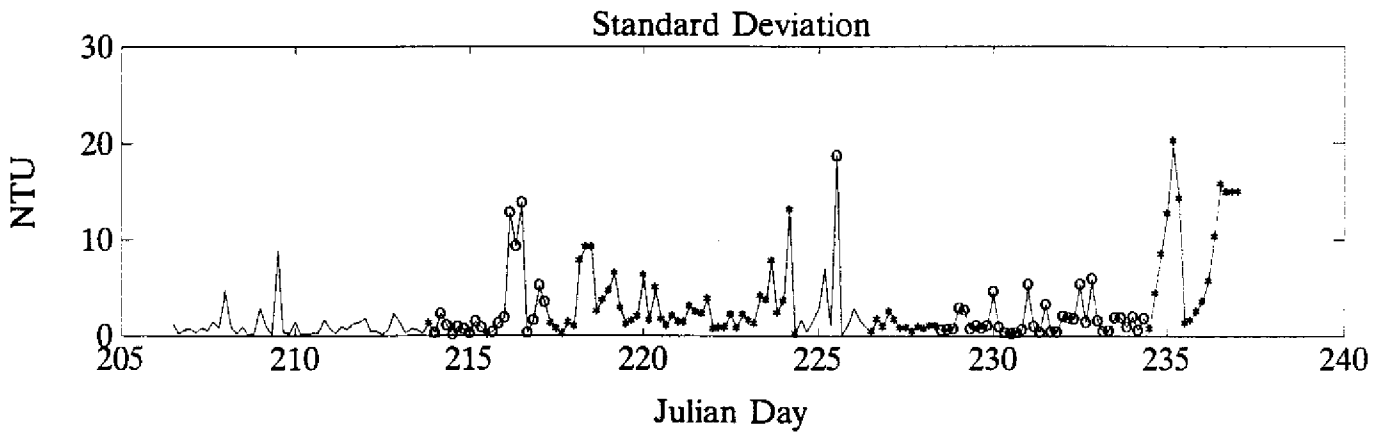
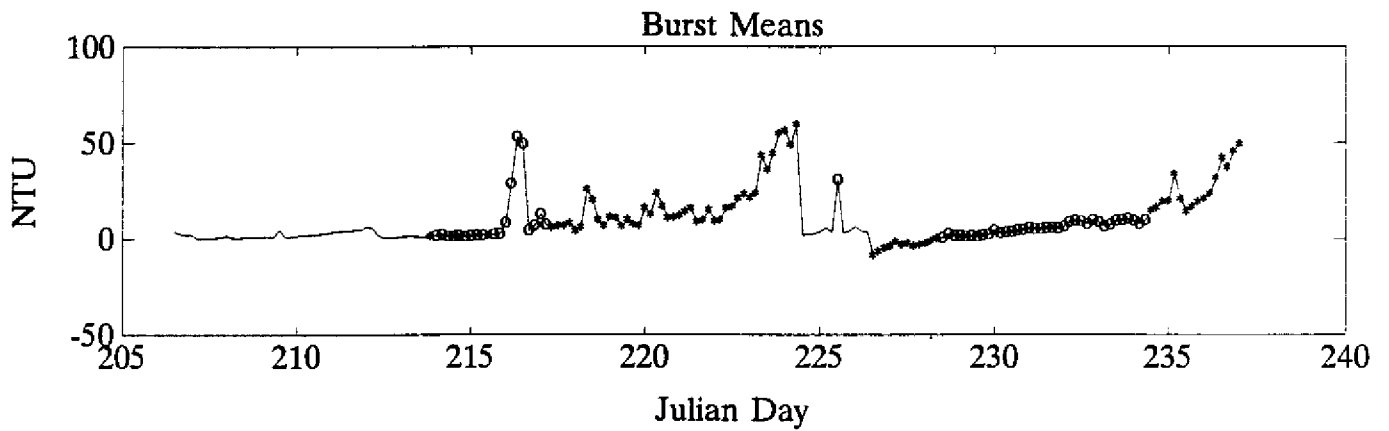
From: July 26, 1991, Julian Day - 206.5

To: August 26, 1991, Julian Day - 237.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H141

Sensor Elevation = 0.85m

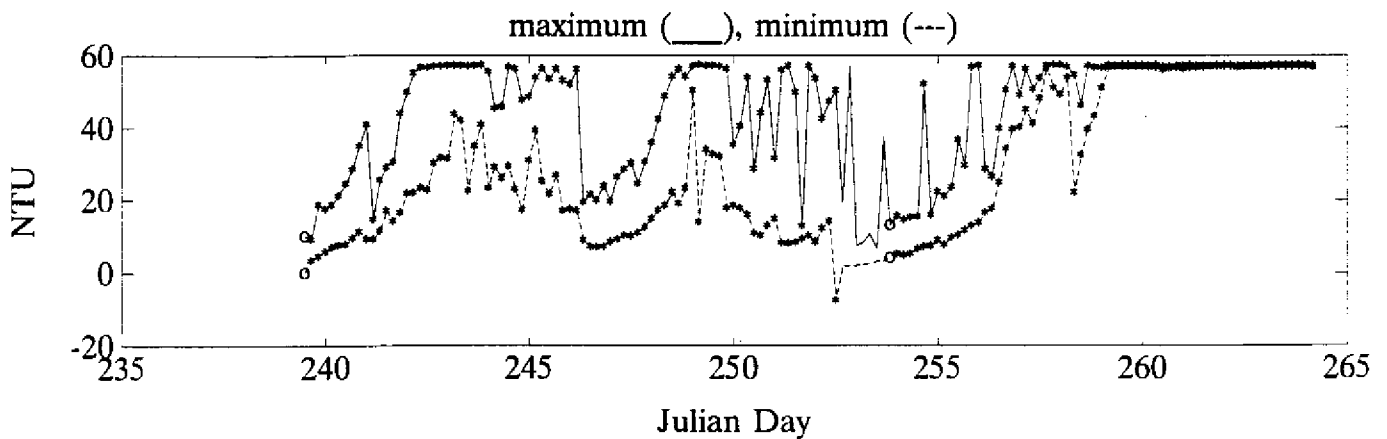
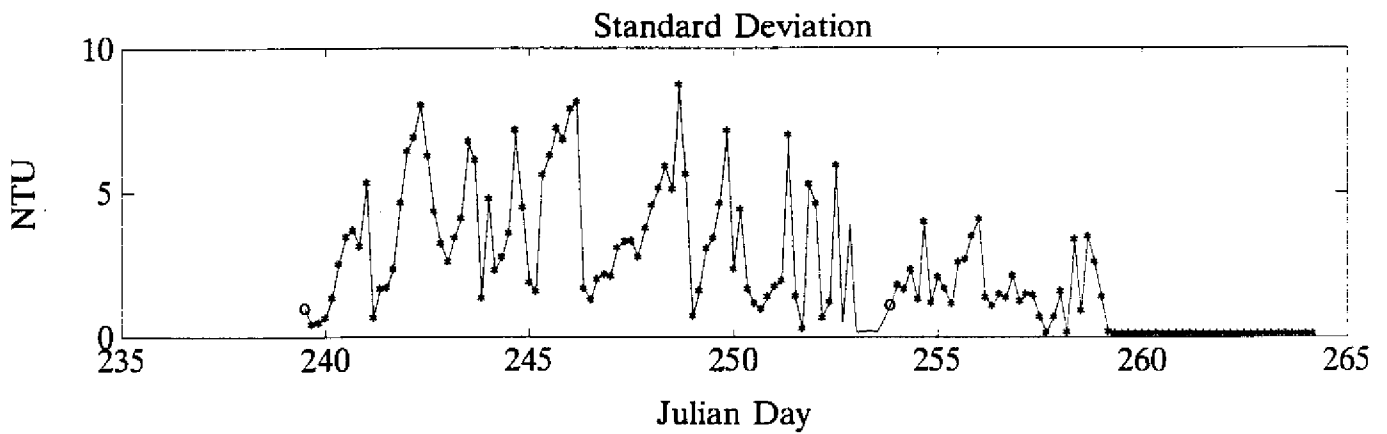
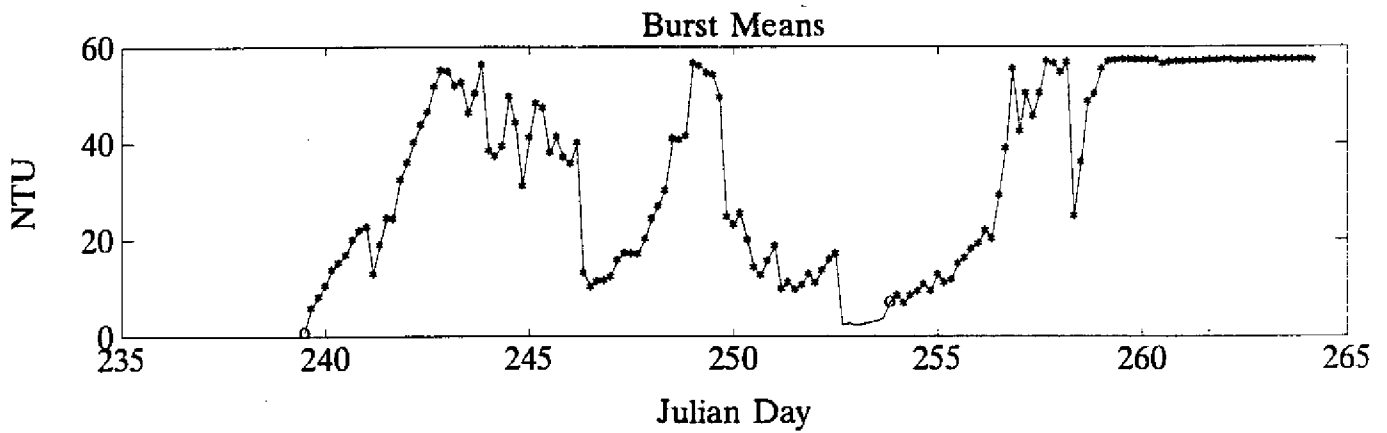
From: August 28, 1991, Julian Day - 239.5

To: September 22, 1991, Julian Day - 264.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H141

Sensor Elevation = 0.5m

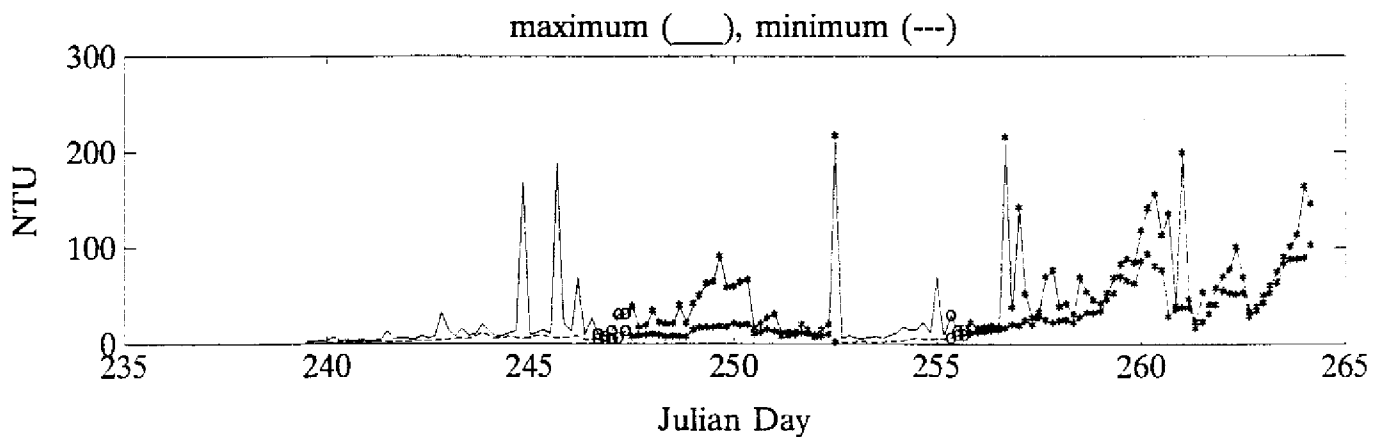
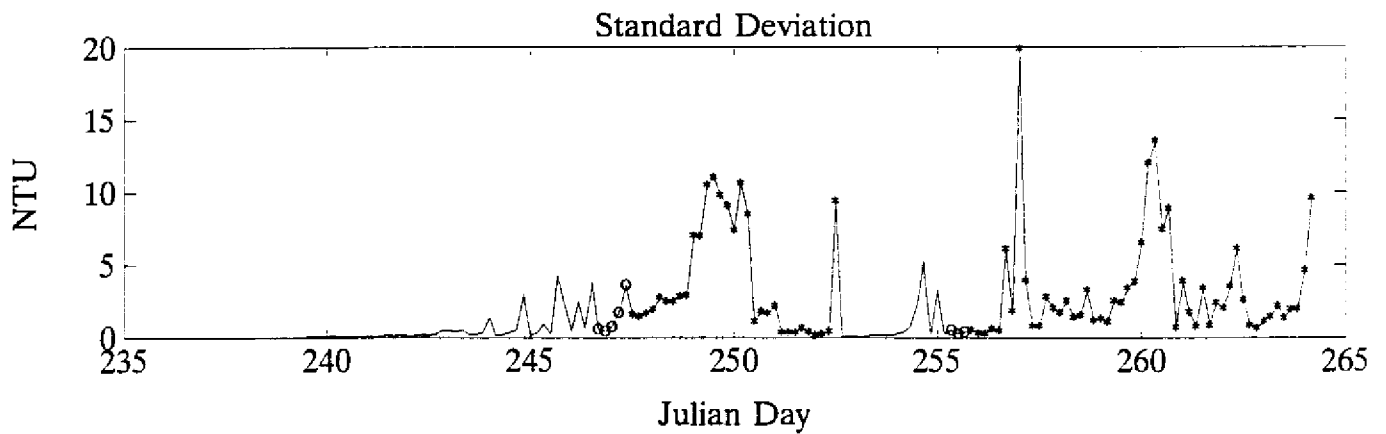
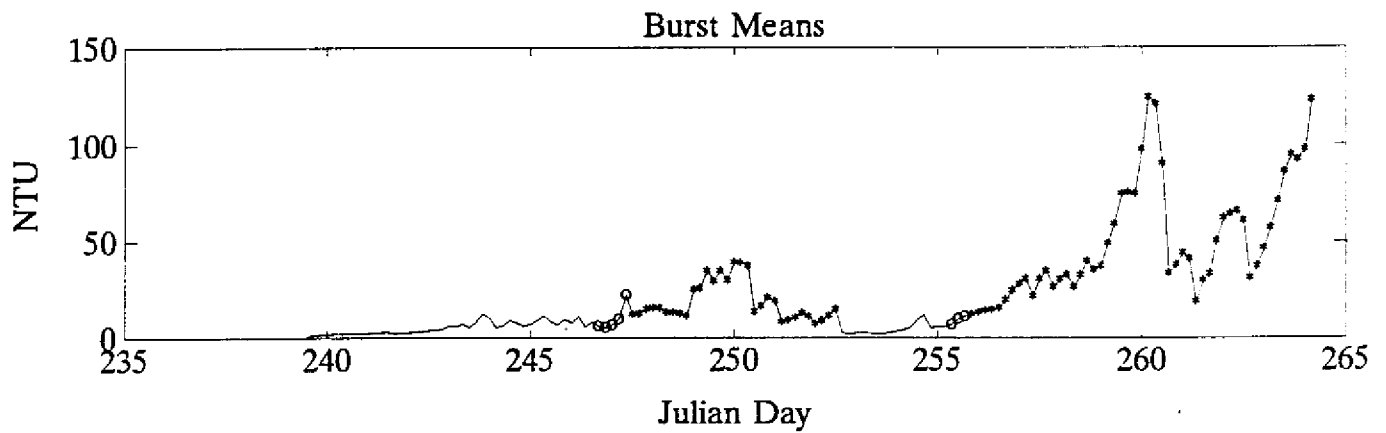
From: August 28, 1991, Julian Day - 239.5

To: September 22, 1991, Julian Day - 264.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H142

Sensor Elevation = 0.1m

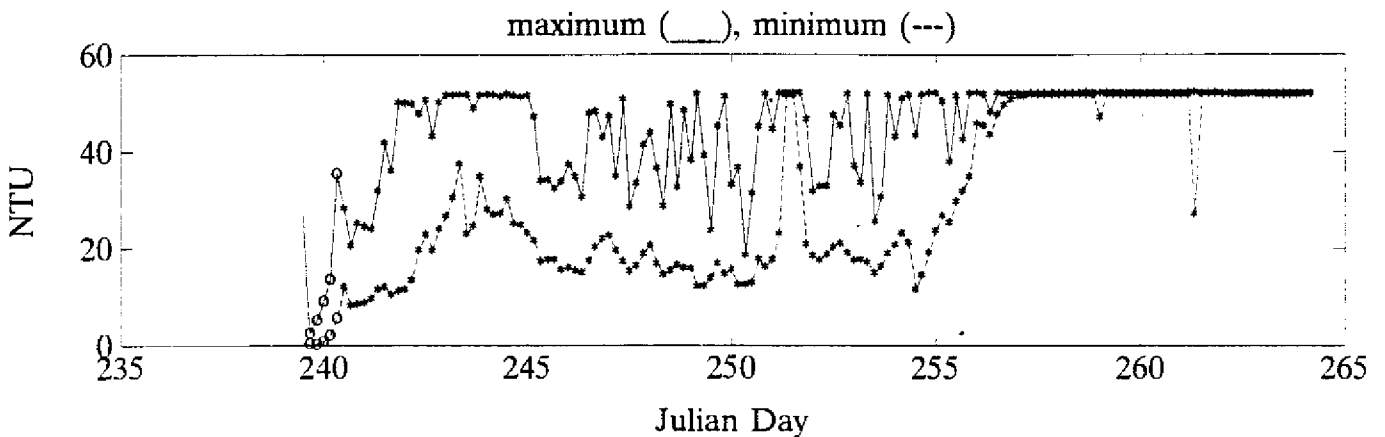
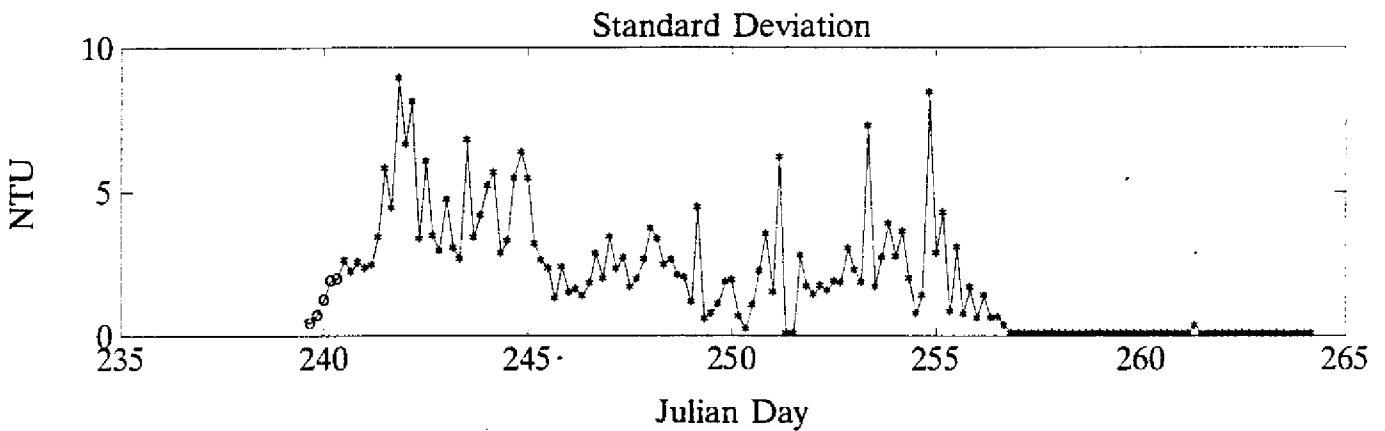
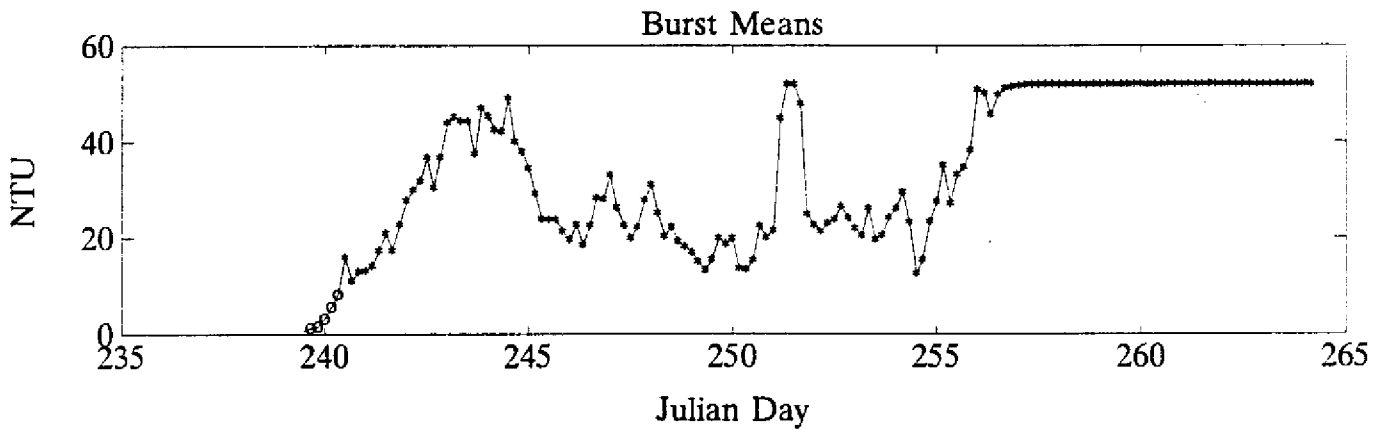
From: August 28, 1991, Julian Day - 239.5

To: September 22, 1991, Julian Day - 264.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H142

Sensor Elevation = 0.8m

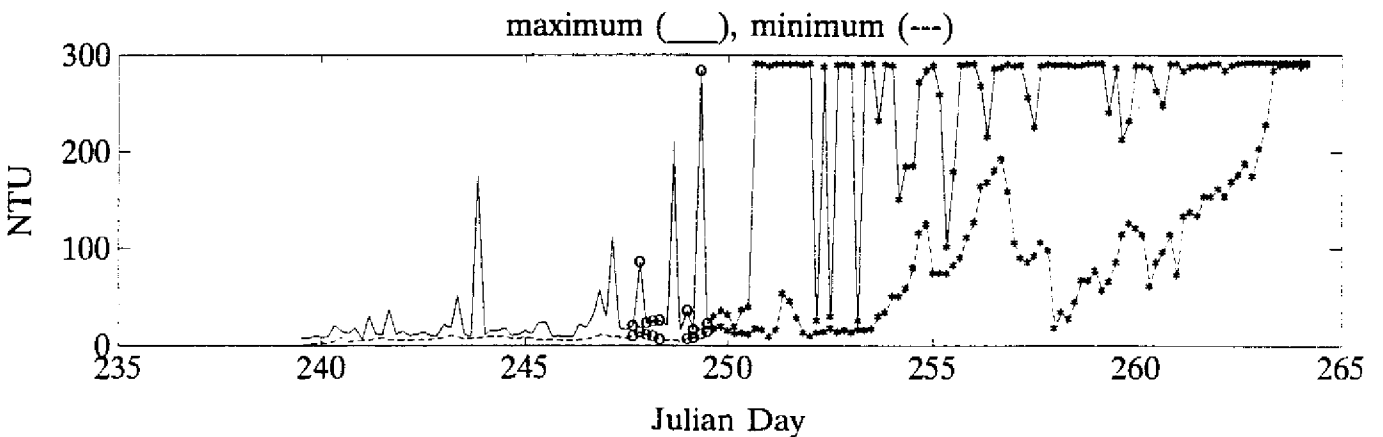
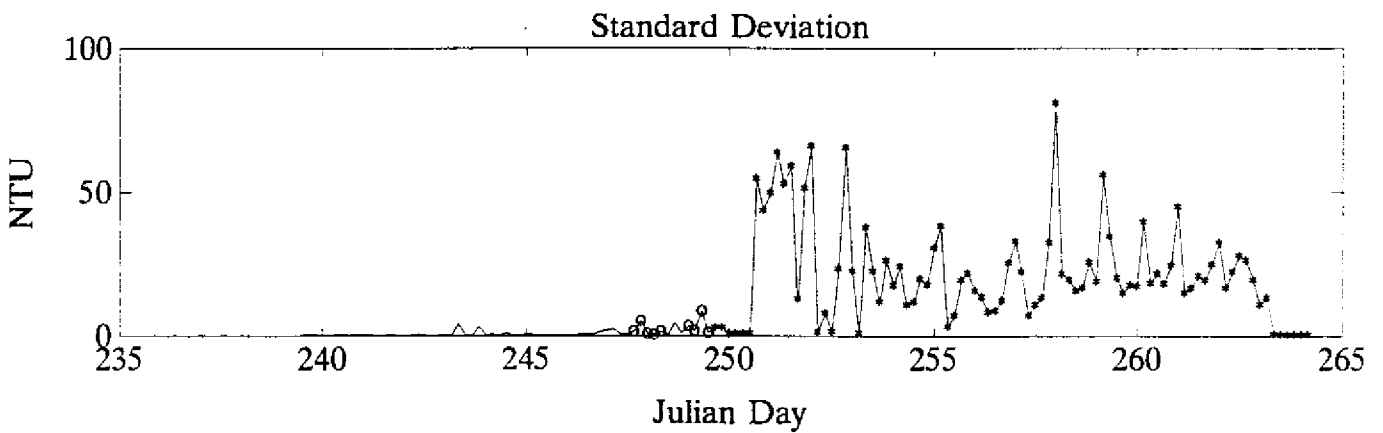
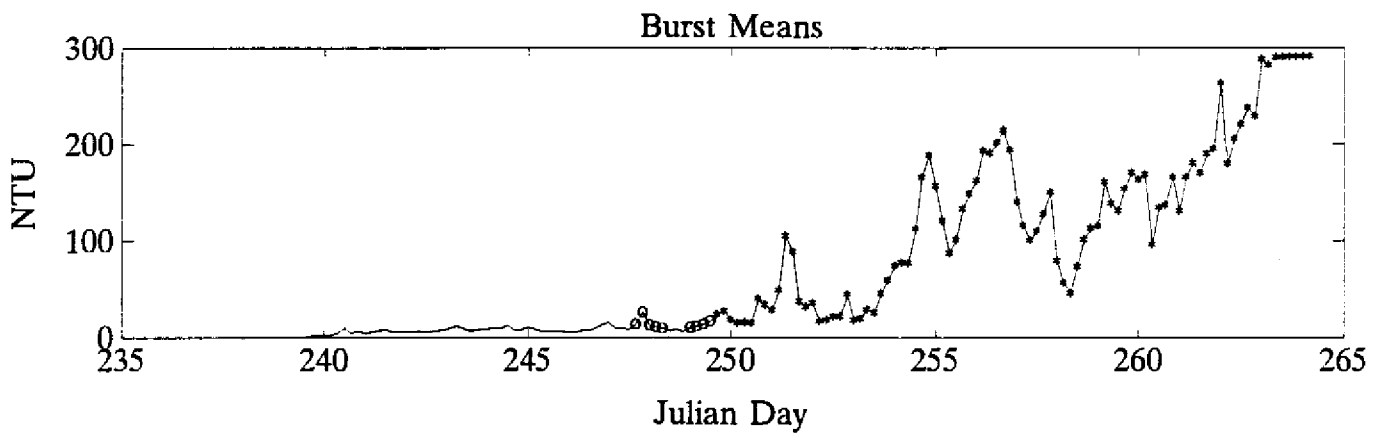
From: August 28, 1991, Julian Day - 239.5

To: September 22, 1991, Julian Day - 264.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H151

Sensor Elevation = 0.5m

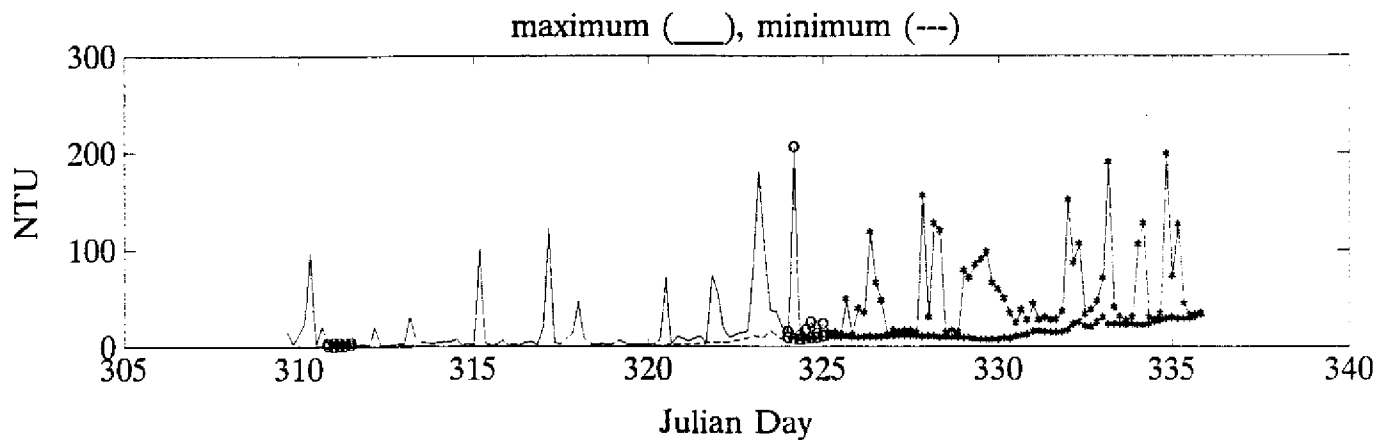
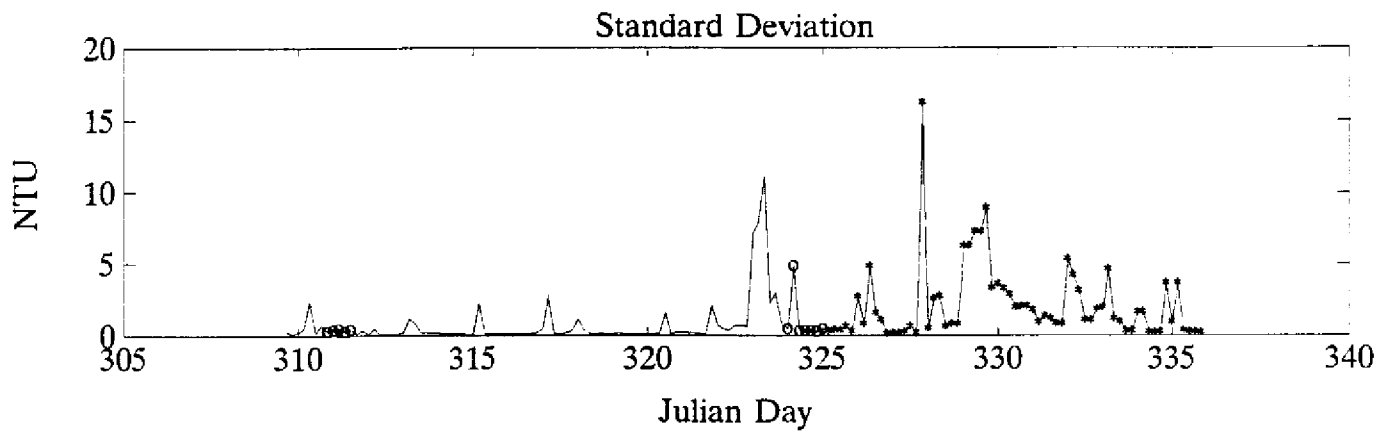
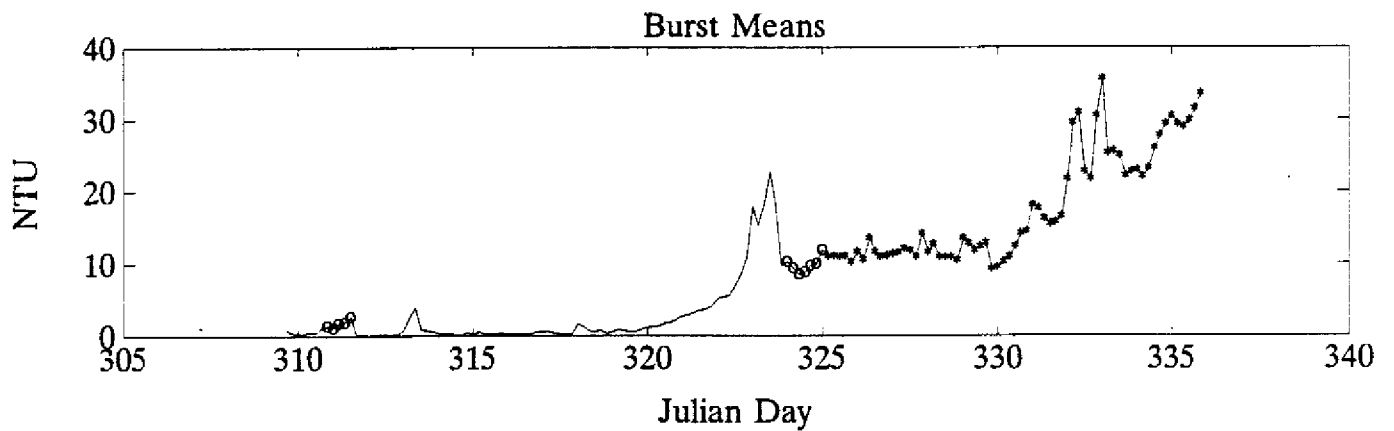
From: November 6, 1991, Julian Day - 309.7

To: December 2, 1991, Julian Day - 335.8

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H151

Sensor Elevation = 0.85m

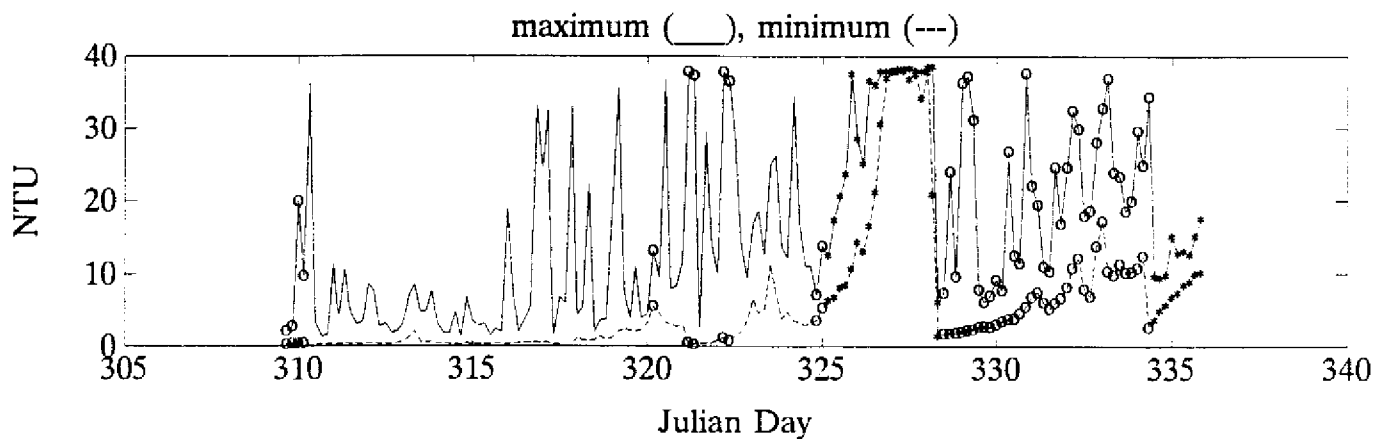
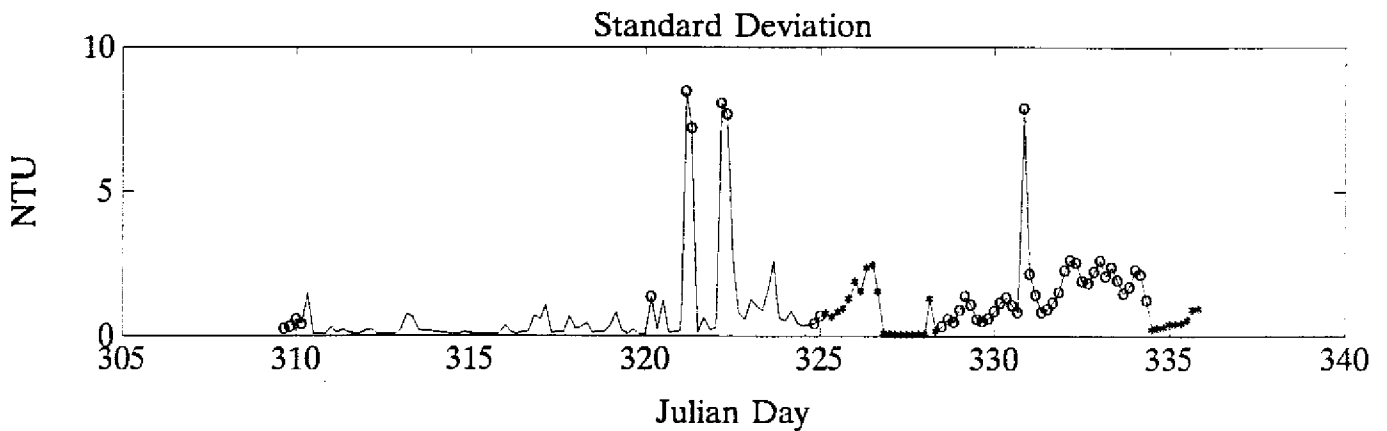
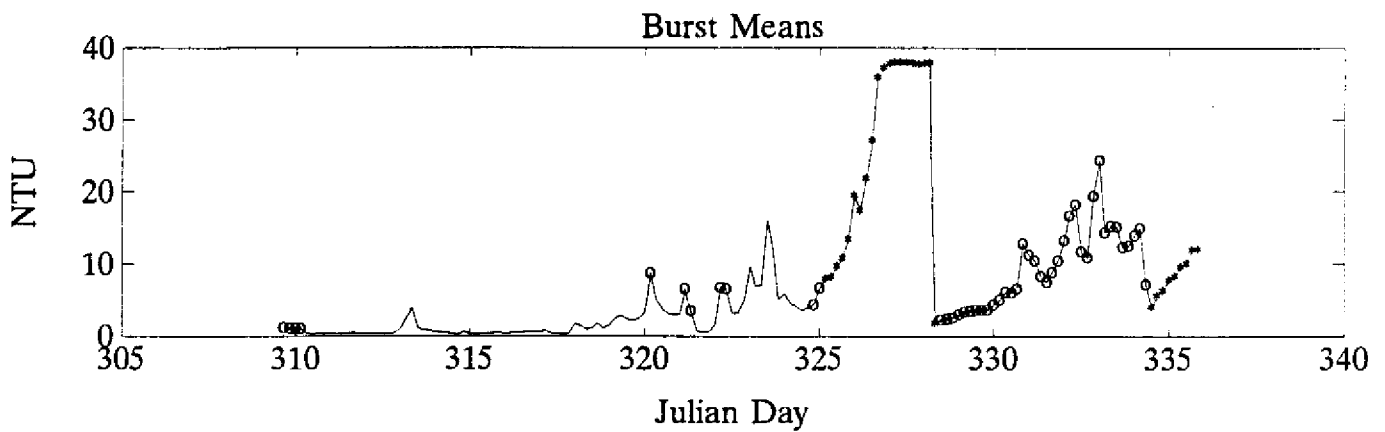
From: November 6, 1991, Julian Day - 309.7

To: December 2, 1991, Julian Day - 335.8

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H152

Sensor Elevation = 0.1m

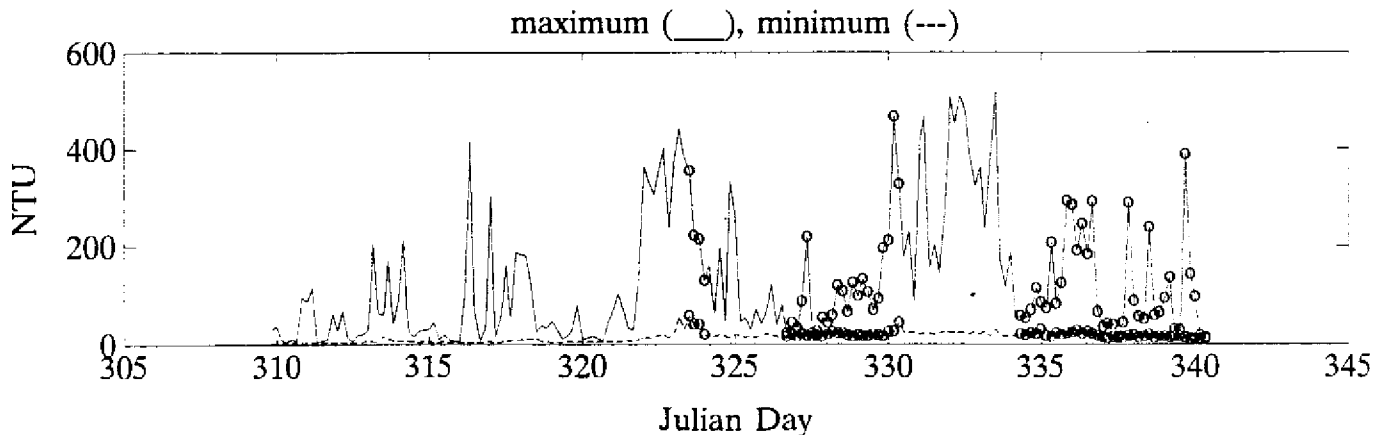
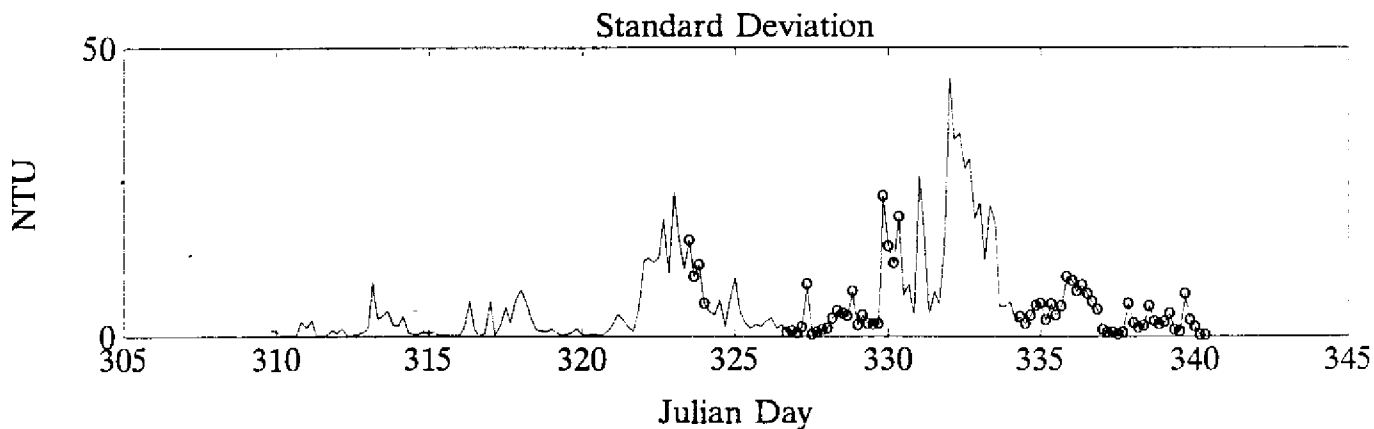
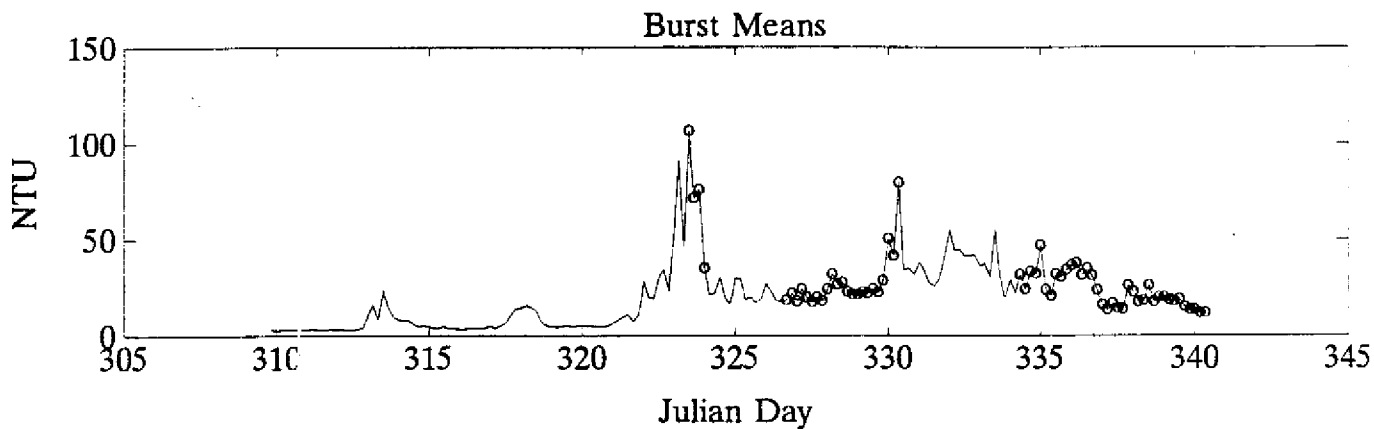
From: November 6, 1991, Julian Day - 309.7

To: December 7, 1991, Julian Day - 340.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H152

Sensor Elevation = 0.8m

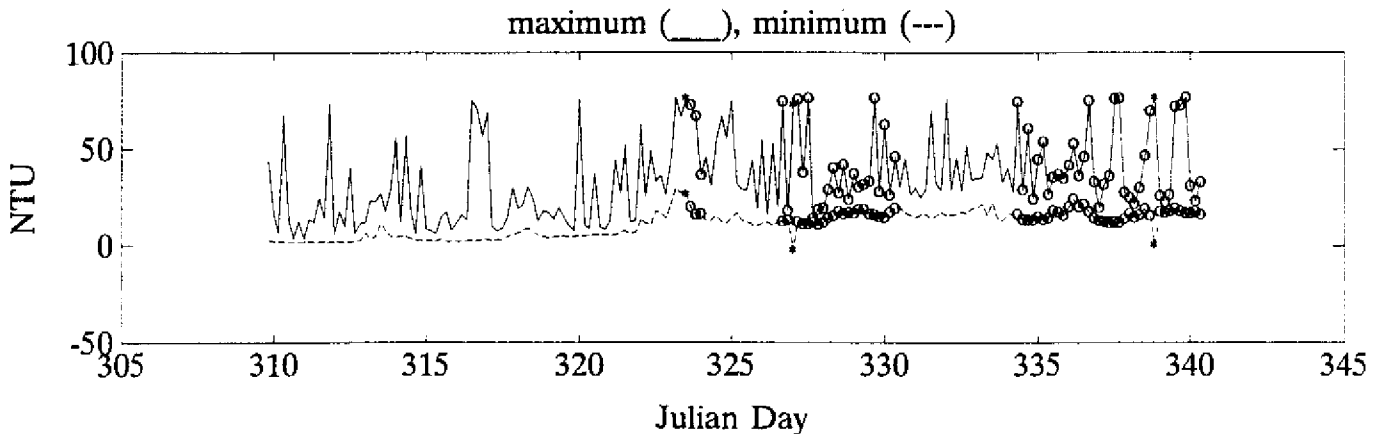
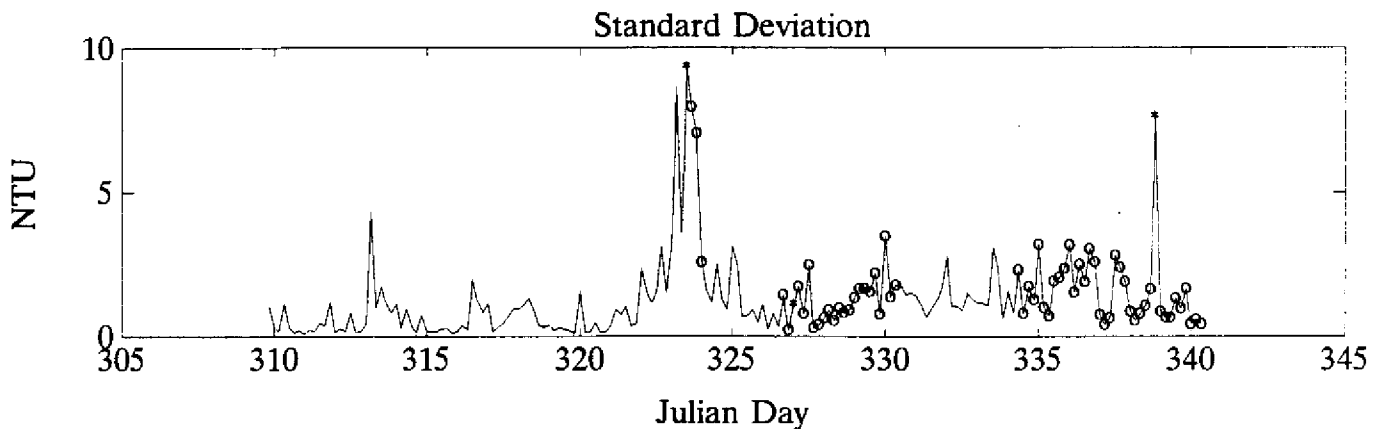
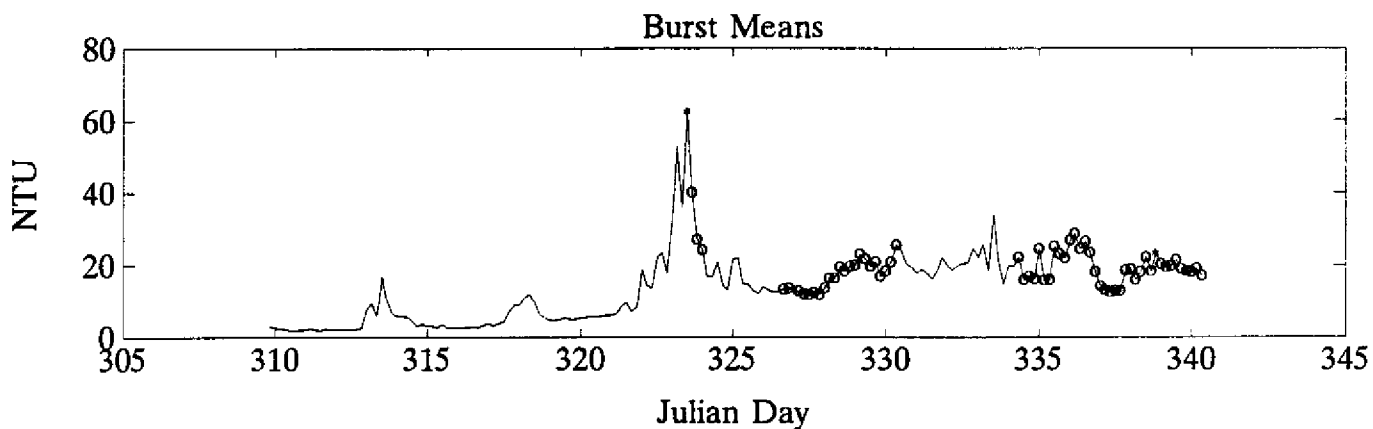
From: November 6, 1991, Julian Day - 309.7

To: December 7, 1991, Julian Day - 340.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H161

Sensor Elevation = 0.5m

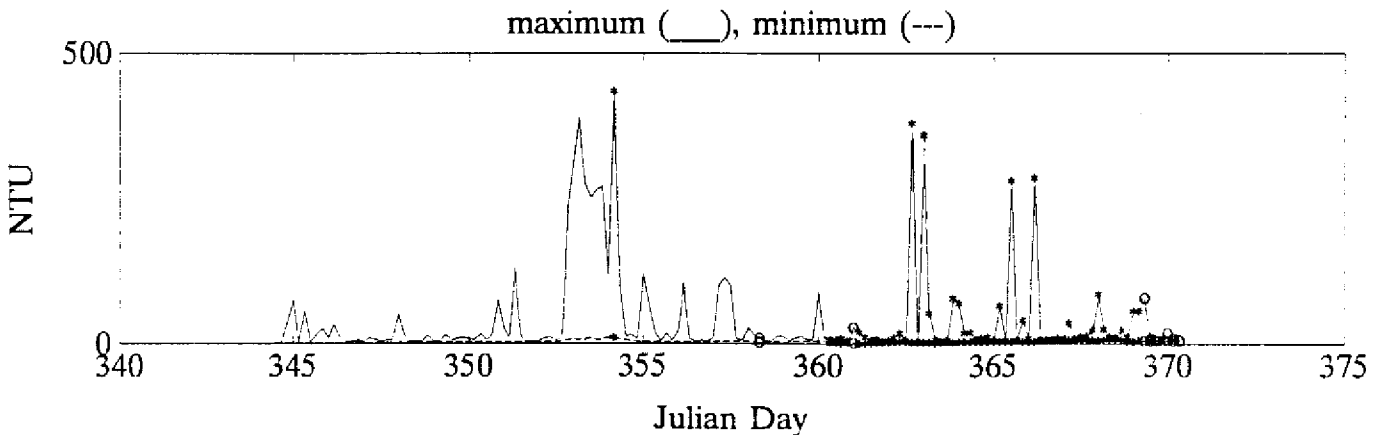
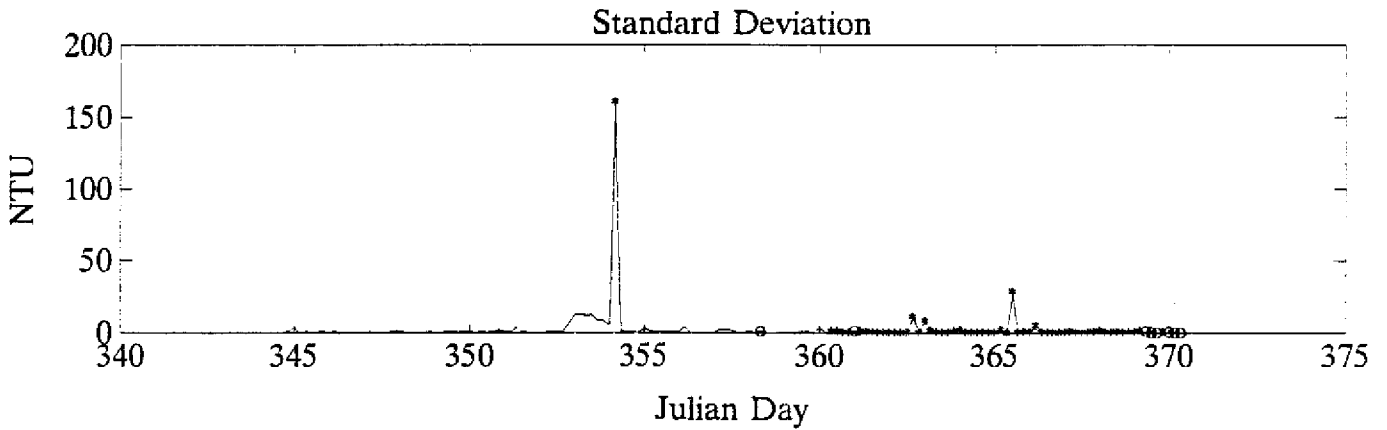
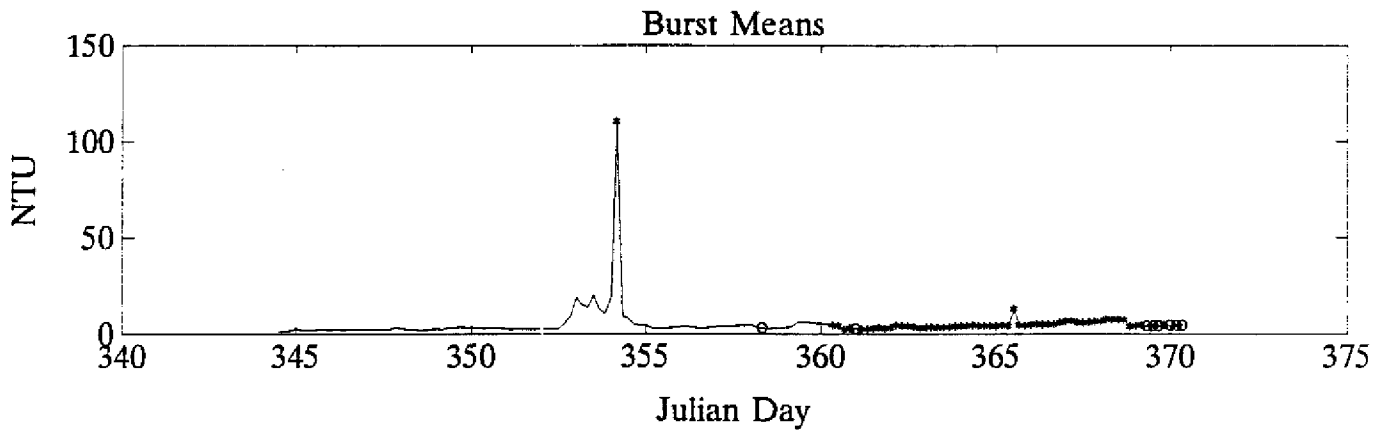
From: December 11, 1991, Julian Day - 344.5

To: January 6, 1992, Julian Day - 5.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H161

Sensor Elevation = 0.85m

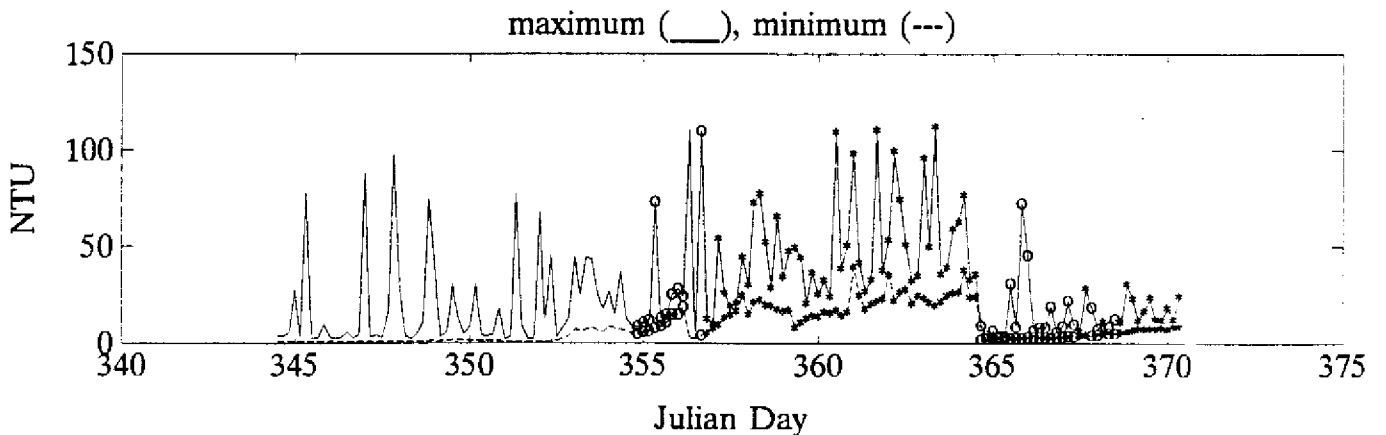
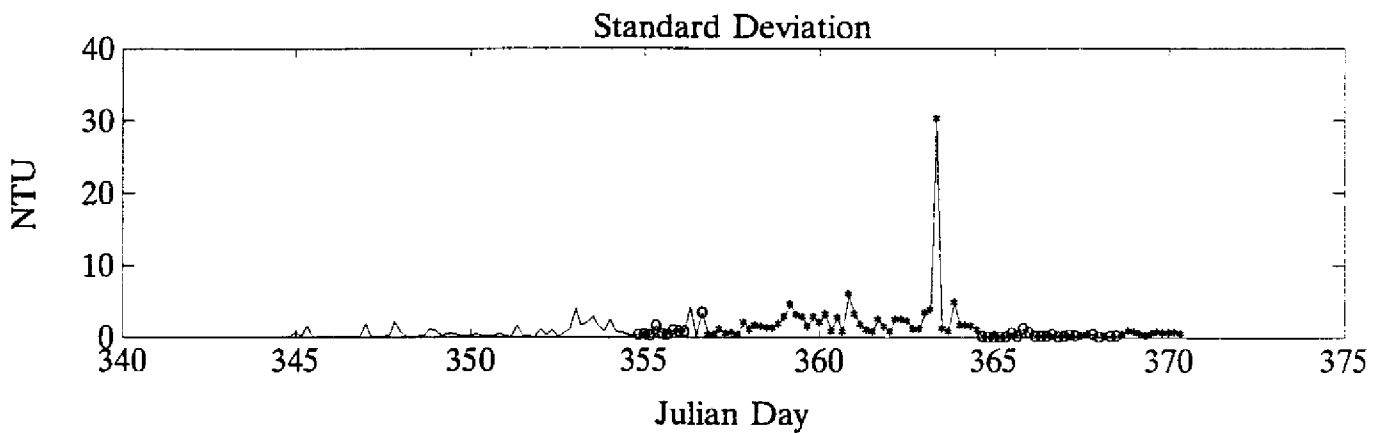
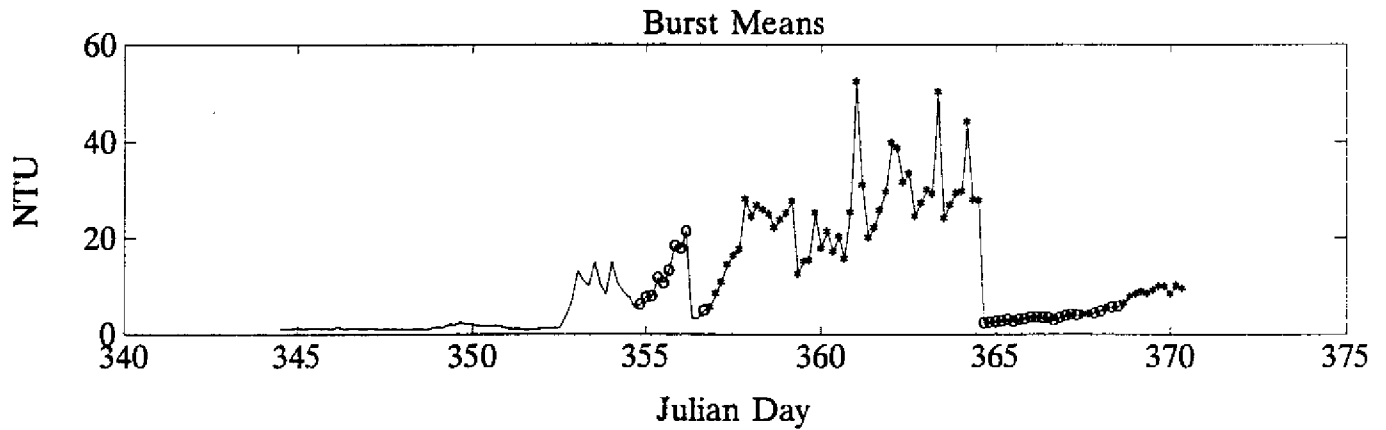
From: December 11, 1991, Julian Day - 344.5

To: January 6, 1992, Julian Day - 5.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H162

Sensor Elevation = 0.2m

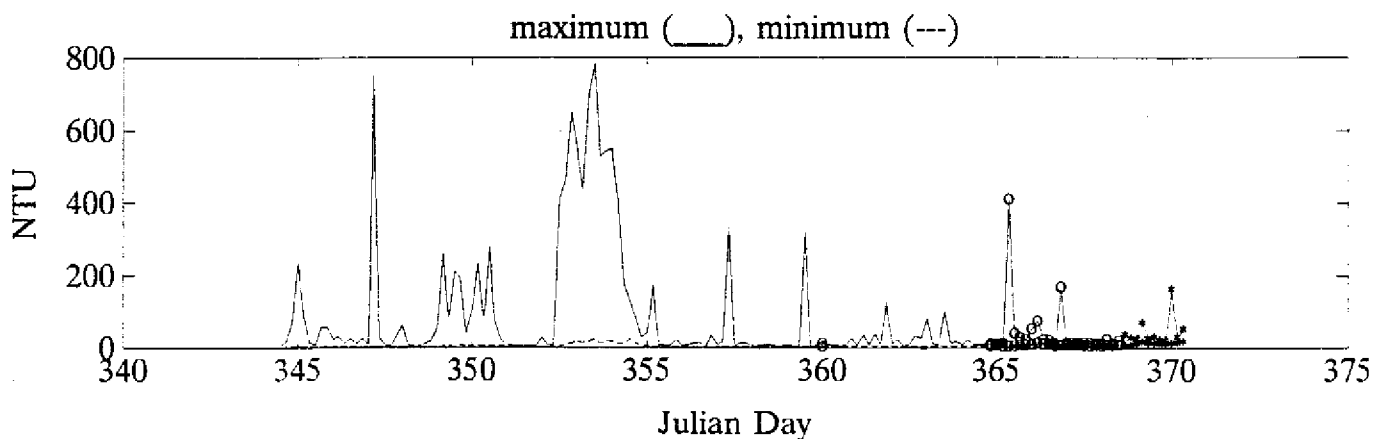
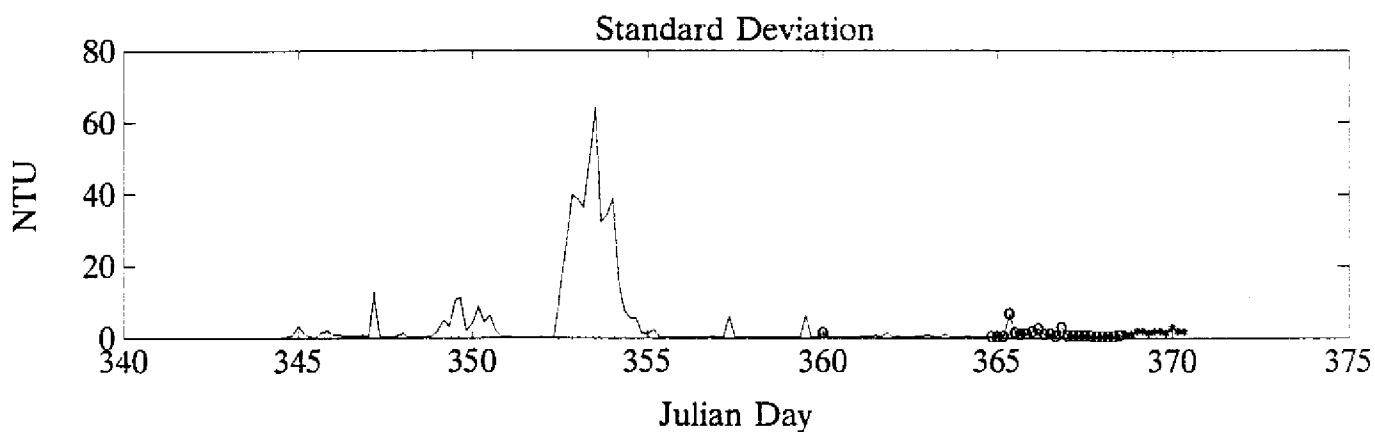
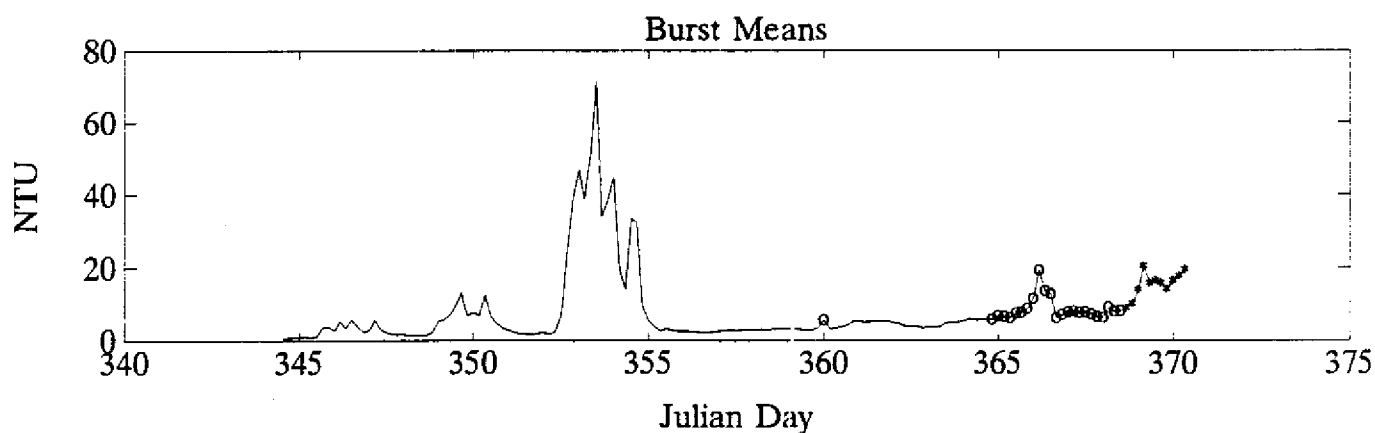
From: December 11, 1991, Julian Day - 344.5

To: January 7, 1992, Julian Day - 6.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H162

Sensor Elevation = 0.85m

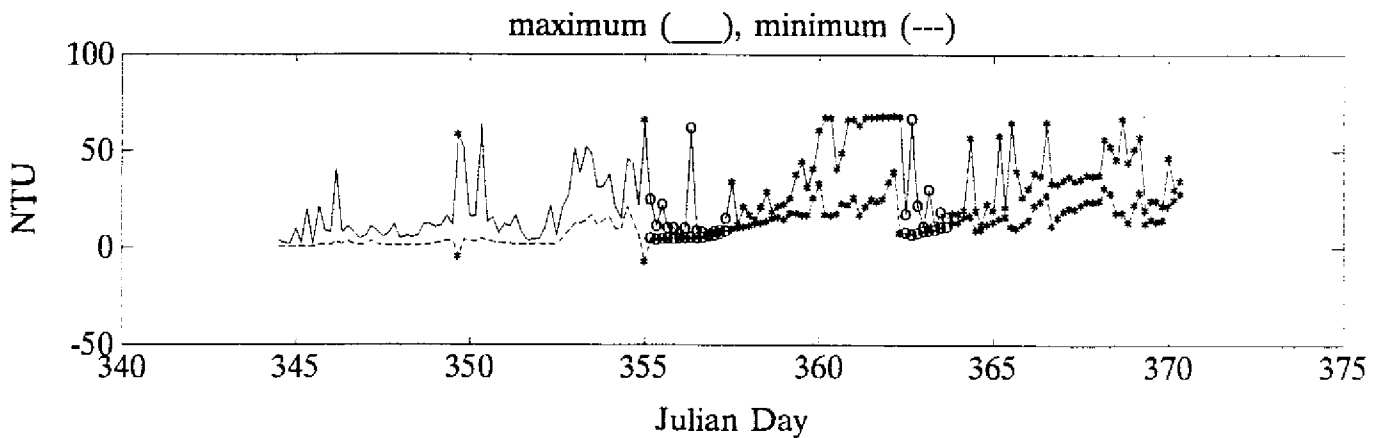
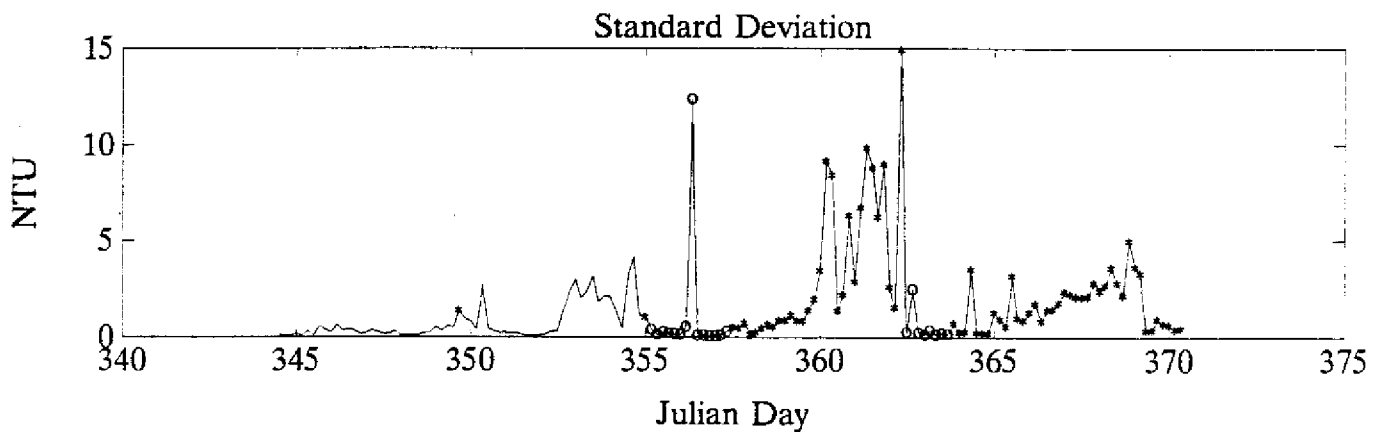
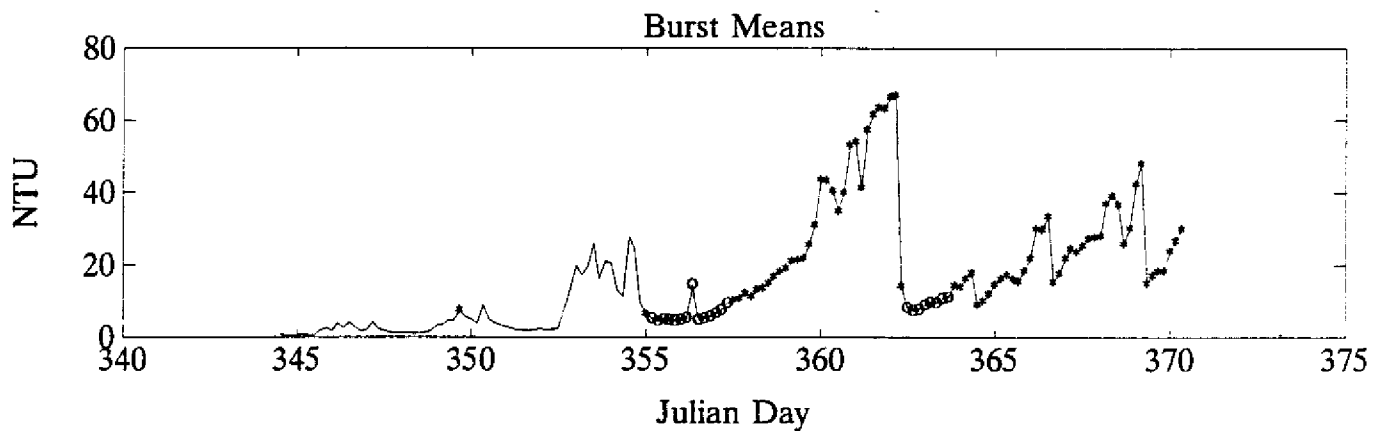
From: December 11, 1991, Julian Day - 344.5

To: January 7, 1992, Julian Day - 6.3

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H182

Sensor Elevation = 0.1m

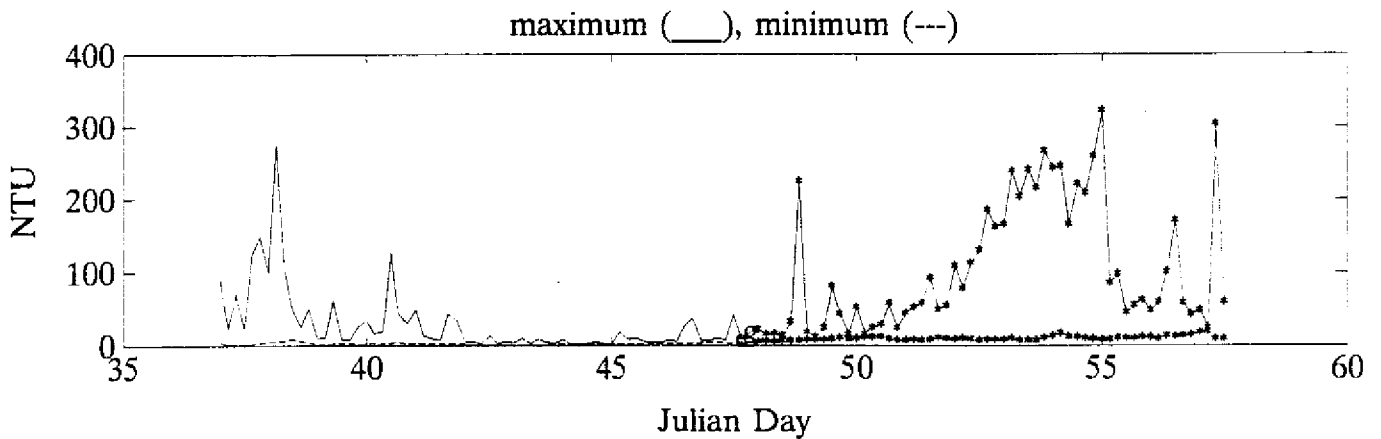
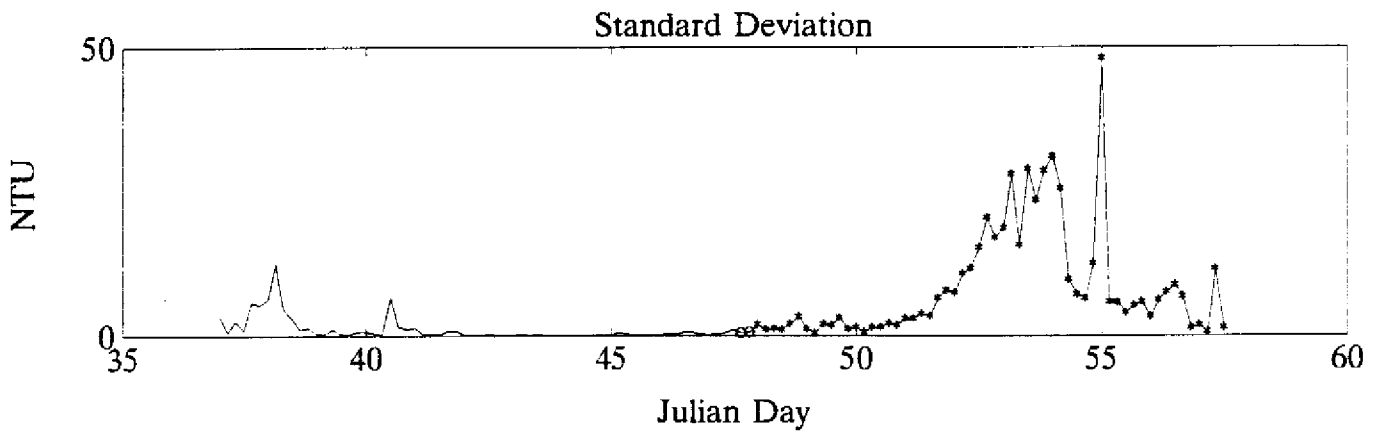
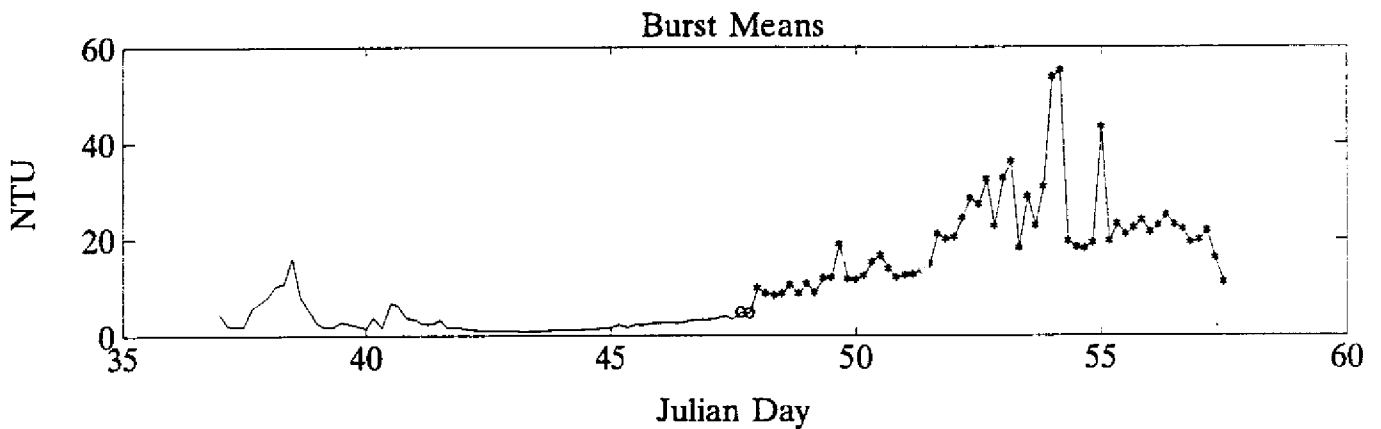
From: February 7, 1992, Julian Day - 37.0

To: February 27, 1992, Julian Day - 57.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H182

Sensor Elevation = 0.8m

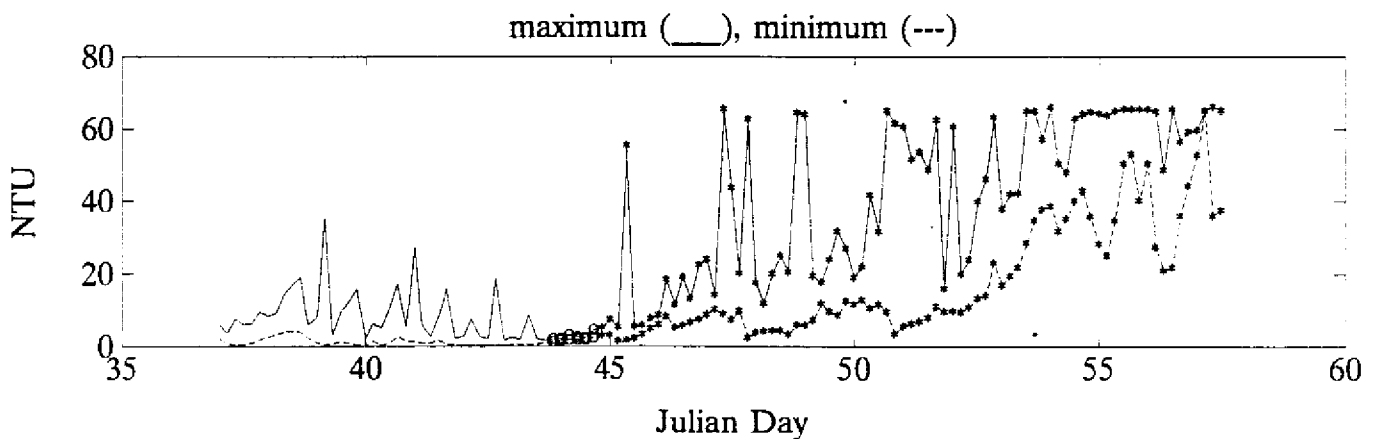
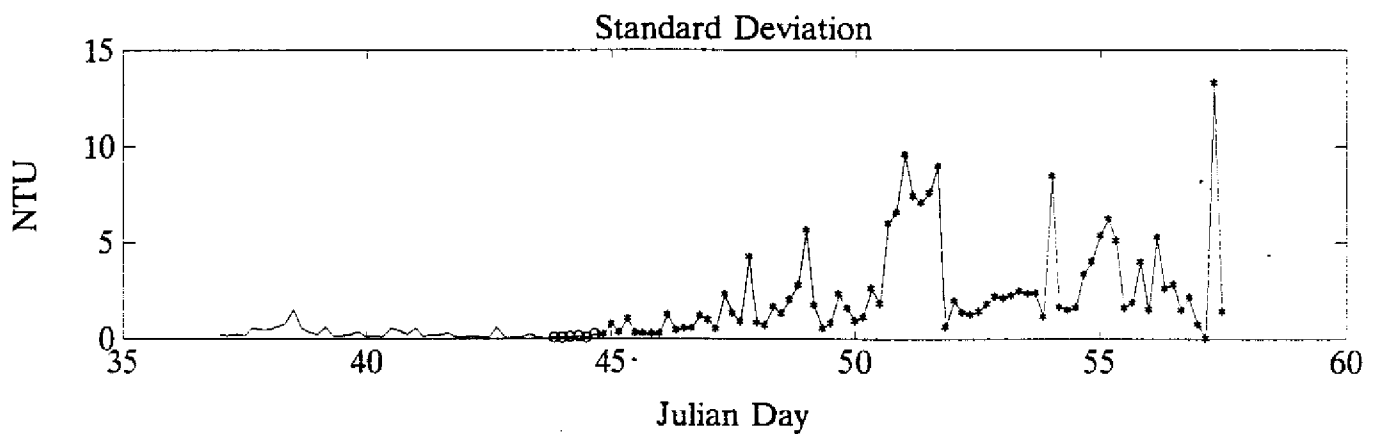
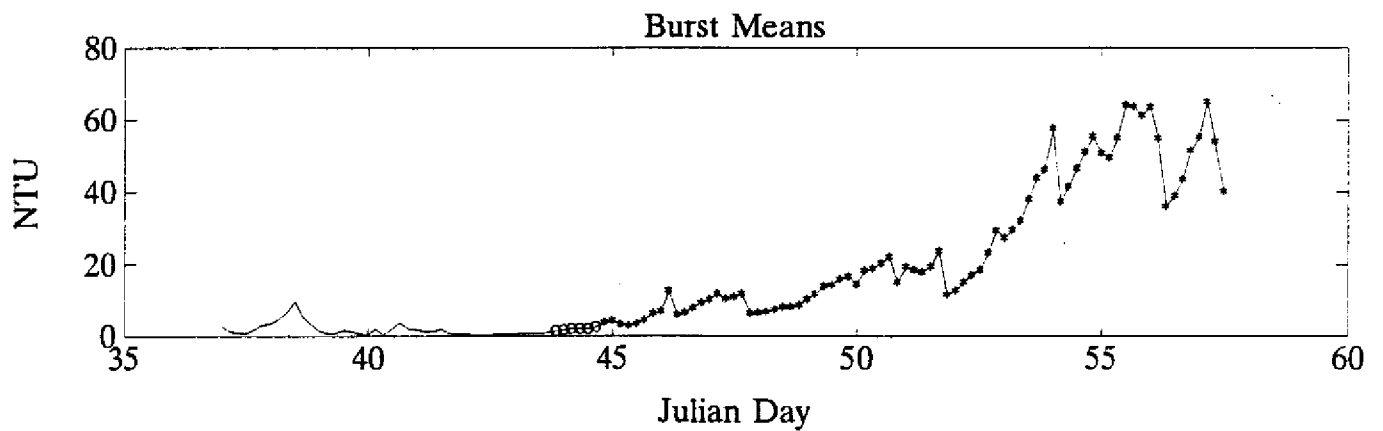
From: February 7, 1992, Julian Day - 37.0

To: February 27, 1992, Julian Day - 57.5

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H191

Sensor Elevation = 0.48m

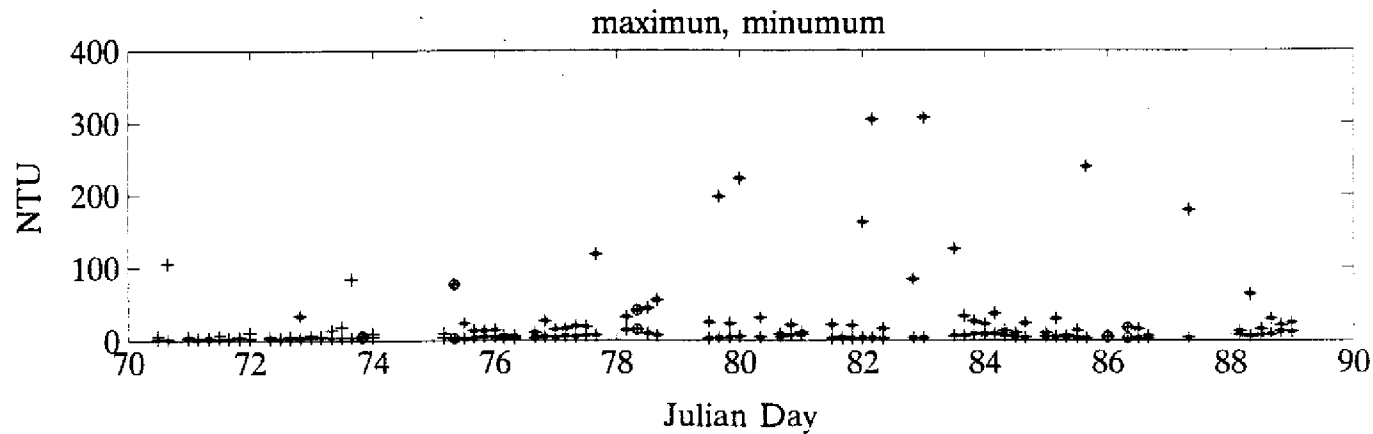
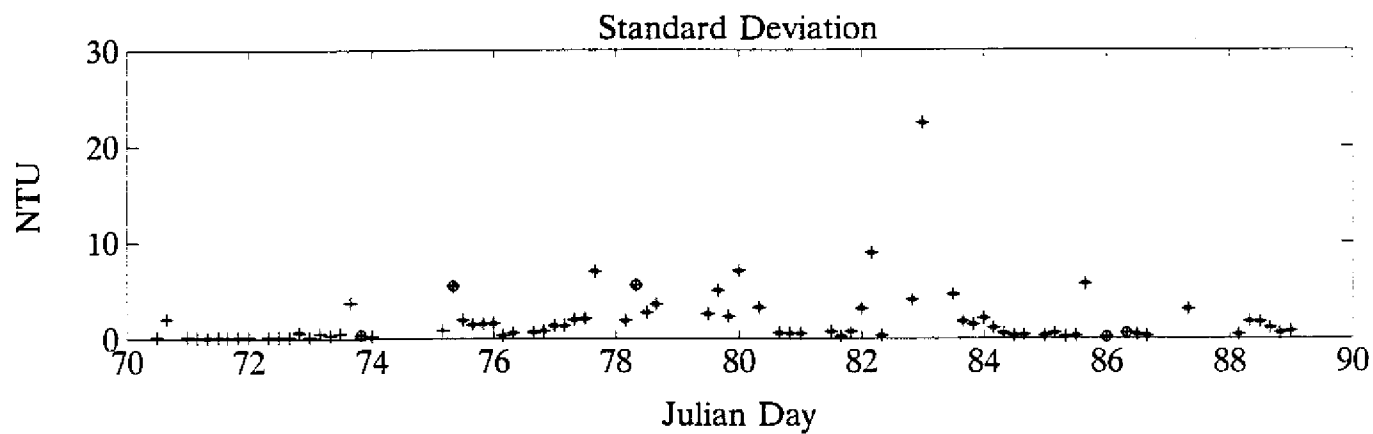
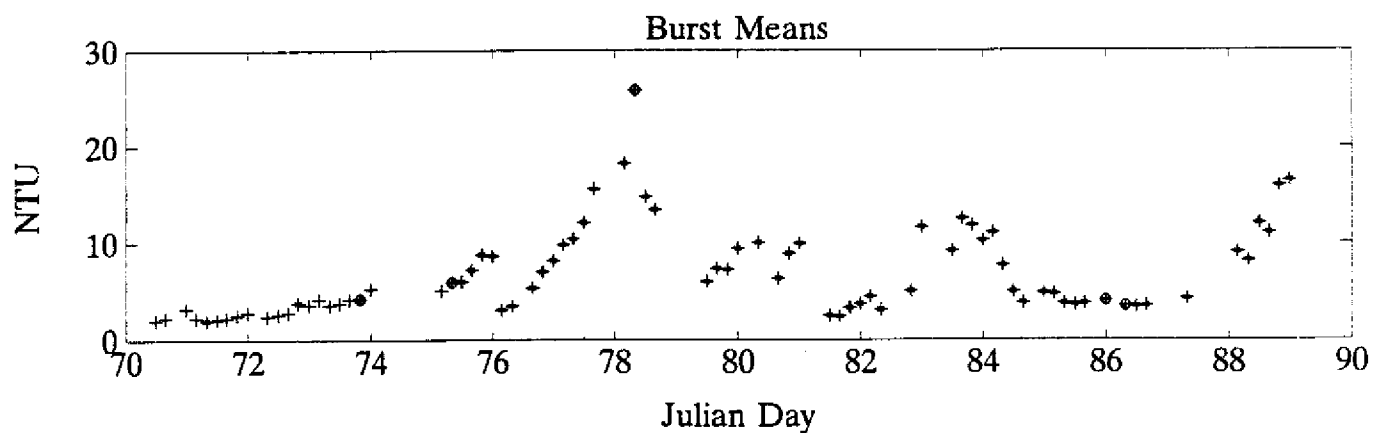
From: March 12,1992 Julian Day - 70.5

To: April 10,1992 Julian Day - 99.0

+ : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H191

Sensor Elevation = 0.8m

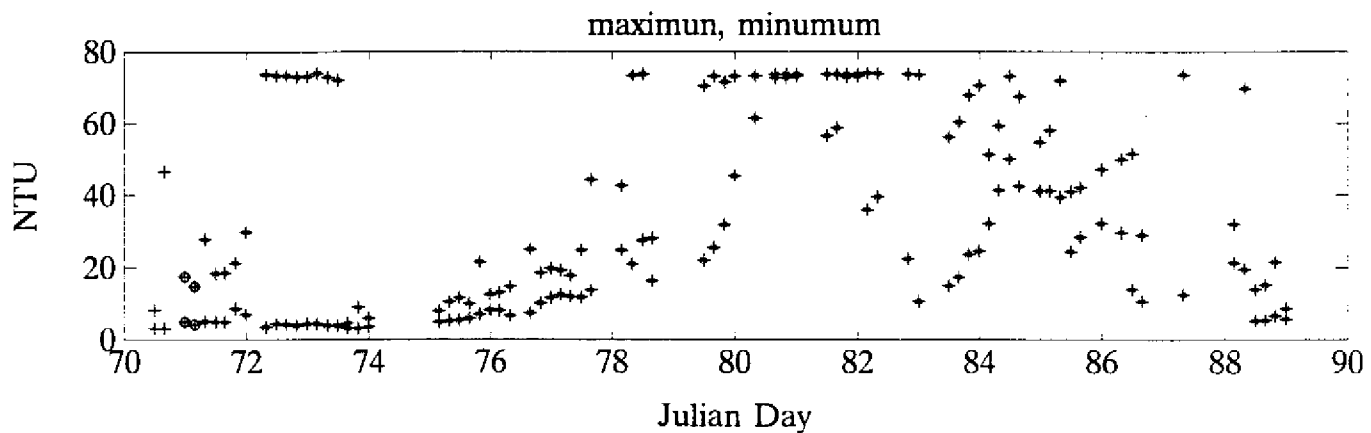
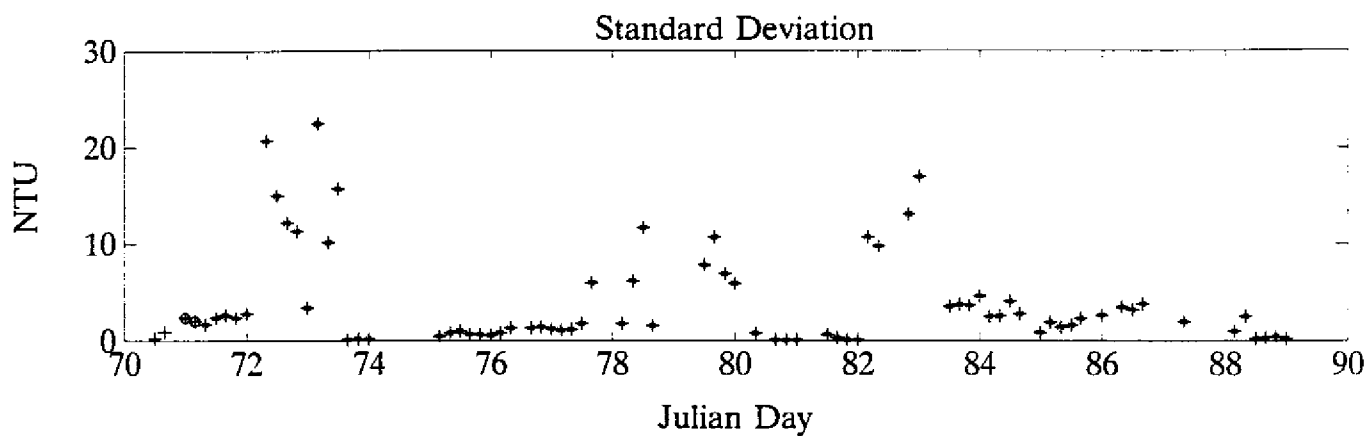
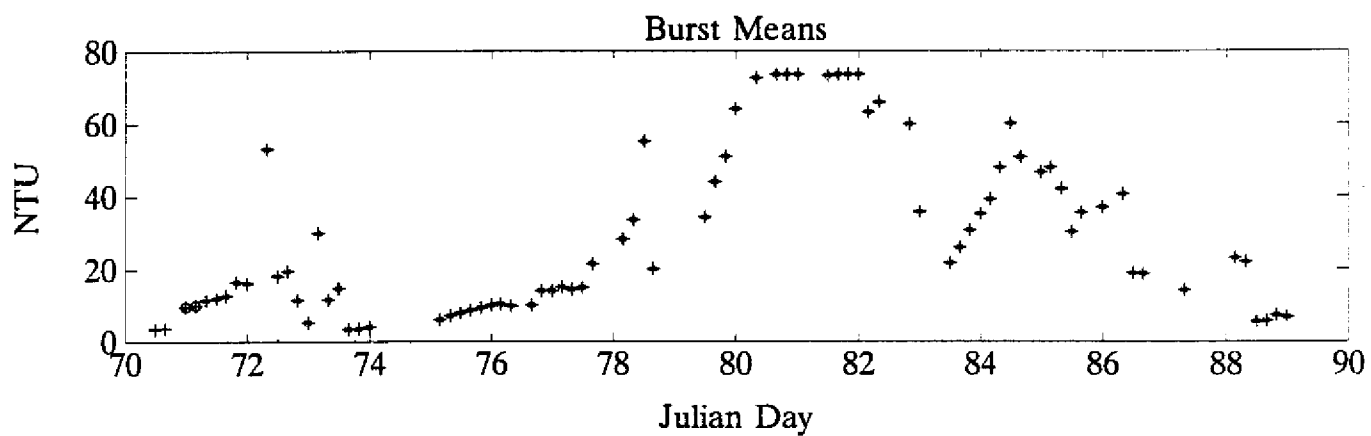
From: March 12,1992 Julian Day - 70.5

To: April 10,1992 Julian Day - 99.0

+ : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H192

Sensor Elevation = 0.15m

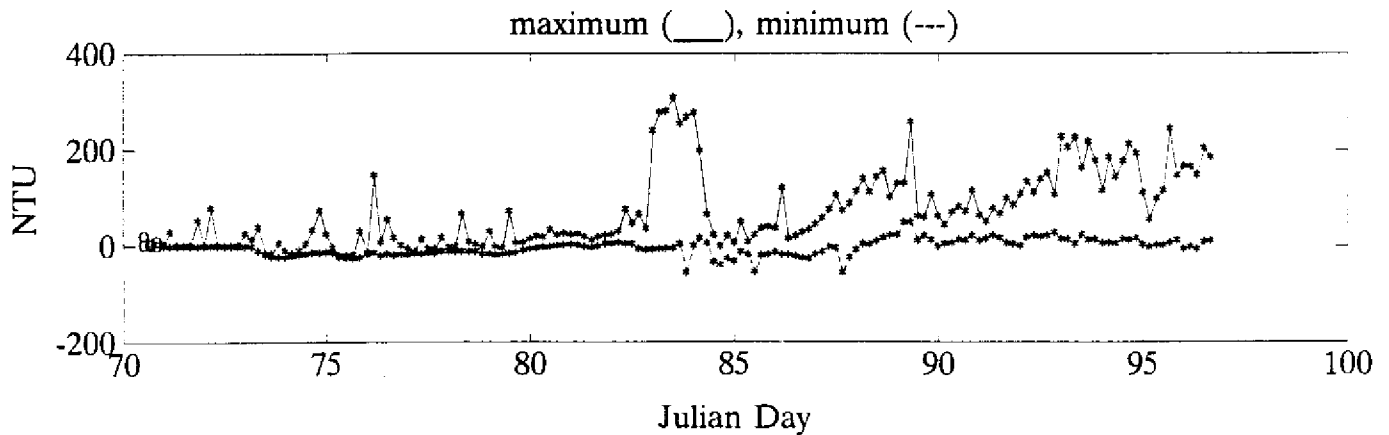
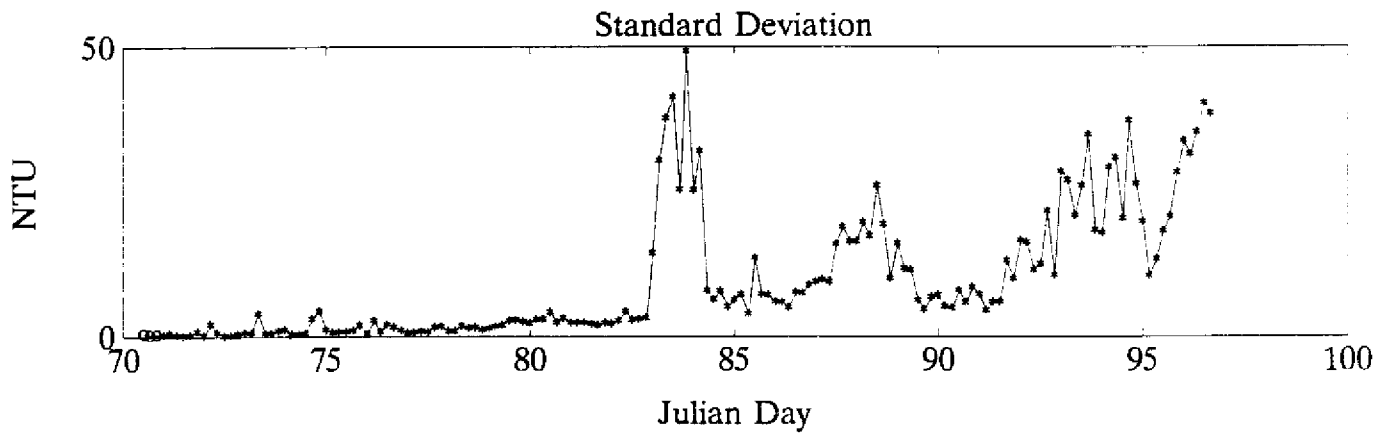
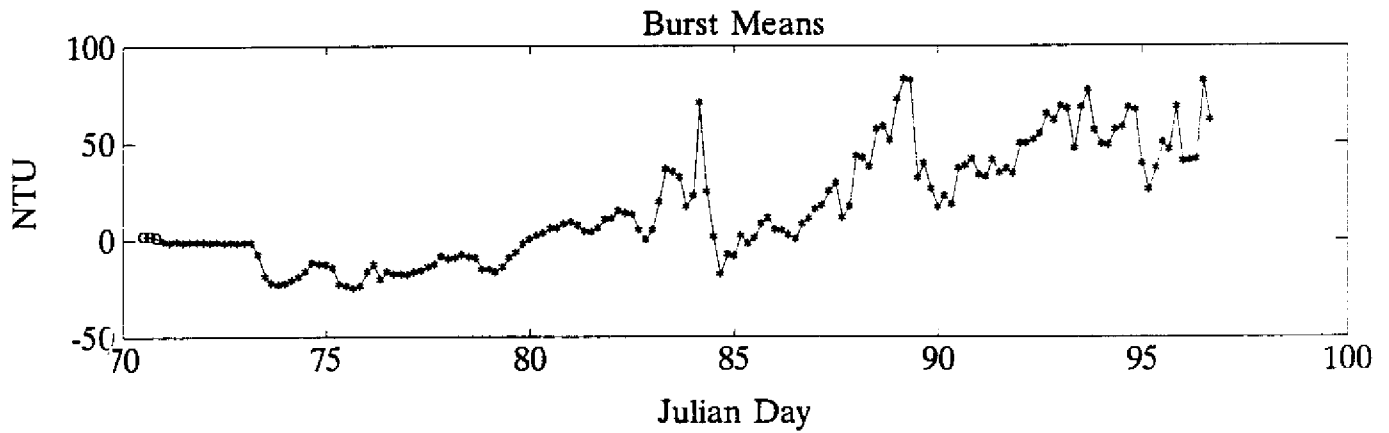
From: March 12,1992 Julian Day - 70.5

To: April 10,1992 Julian Day - 99.0

- : good data

o : data with reduced accuracy

* : bad data



TURBIDITY FOR DEPLOYMENT H192

Sensor Elevation = 0.84m

From: March 12,1992 Julian Day - 70.5

To: April 10,1992 Julian Day - 99.0

- : good data

o : data with reduced accuracy

* : bad data

