

浮遊式海洋構造物の実海域実験

海象、動揺、構造応答の定時計測資料

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At-Sea Experiment of a Floating Offshore Structure
 Results of the Observed Sea States , Motion and Structural Responses
 by
 Kiyokazu YAGO、Yutaka OHKAWA

Abstract

At-Sea Experiment of the Floating Offshore Structure 'POSEIDON'
 brought many kind of useful results during 1986 and 1990.

This paper describes some examples of the observed results on sea states, on motions and on structure responses.

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1. はじめに

POSEIDONの実海域実験は、多くの有益な観測データをもたらした。本資料では、1996年7月～1990年6月の間に、実海域実験で取得されたデータの内から、海象、動揺、構造応答に関して、定時計測で得られた結果の代表例を掲載する。

2. 海象、動揺、構造応答の定時計測資料

(1) 統計量の経時変化図について

定時計測データの内から、海象、動揺、構造歪の代表例を選び、それぞれの統計量の1カ月毎の経時変化を示す。但し、海象の内、流れについては1時間毎の経時変化として示す。

左側の頁は海象(風、波浪、流れ)の経時変化である。

風は定時計測時間中の平均風速と、16方位で表現した風向について示す。風向は風の吹いてくる方向を表す。

波浪は定時計測時間中の有義波高と有義波周期を示している。

流れのデータは、2分毎に計測した平均流向、流速を、毎時間、定時計測開始時間に相当する約34分間分取り出し平均した値で表す事にする。こうして求めた平均流速、流向を1時間毎の変化として結果をベクトル図で示す。ベクトル線の方向は流れが流れて行く方向を表す。

右側の頁は動揺、構造応答の経時変化を表している。

動揺は、①加速度、②加速度をフーリエ解析による2回積分で求めた直線運動、③ジャイロで計測した回転運動の順に示している。それぞれの値は定時計測の時系列データから求めた標準偏差である。

構造応答は、カラム曲げ歪(No. 1)、ブレース軸歪(No. 9)、上部構造Iガーダ曲げ歪(No. 11)の3点を示す。これらも時系列データから求めた標準偏差である。

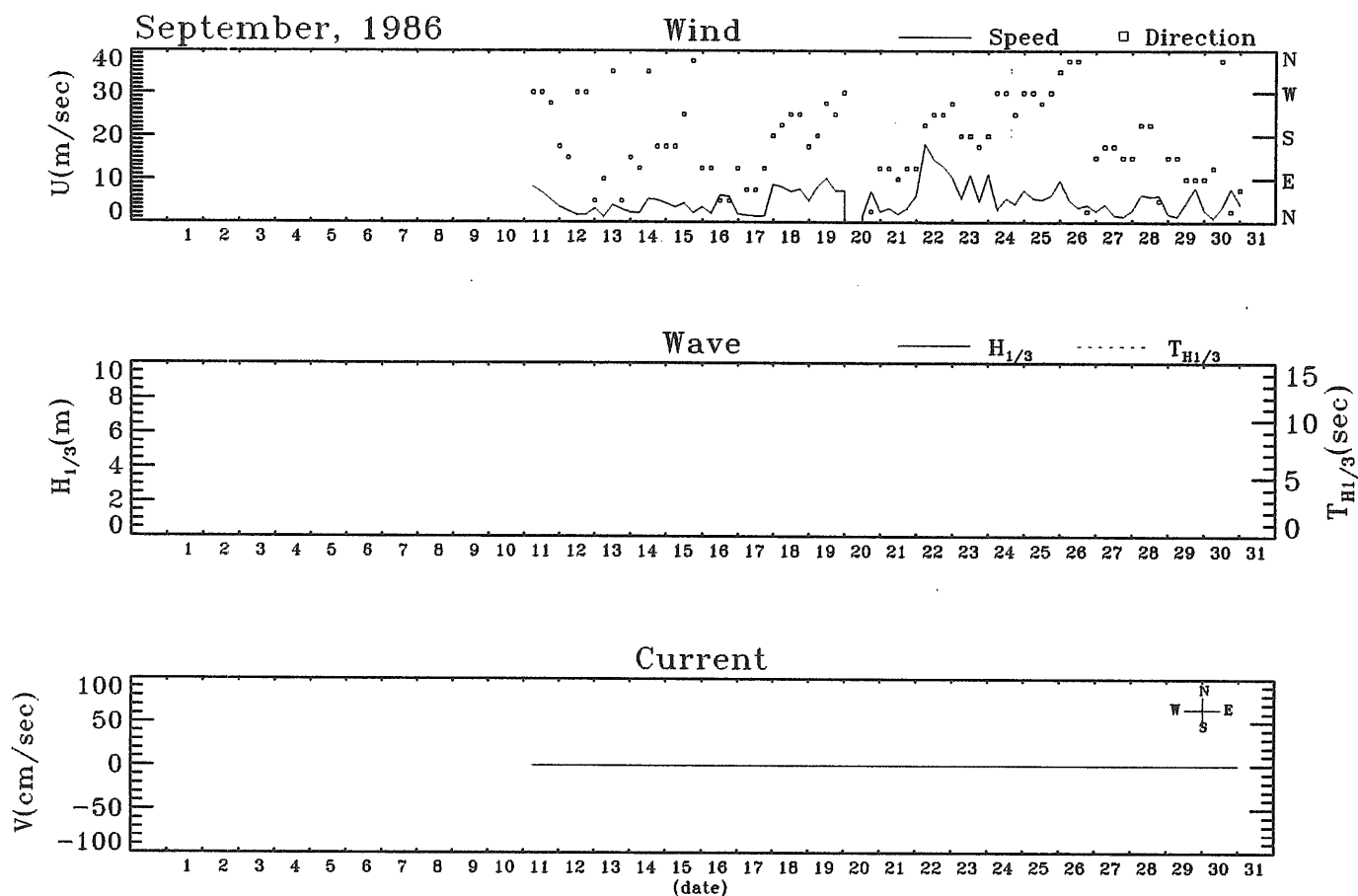
(2) 欠測および不良データの扱い

計測器の故障等によりデータ収録が出来なかったり、データ中にノイズが混入したりして解析結果の精度が充分でないと判断されるデータは除外した。このような、欠測および不良データについては値を0にして表示している。経時変化図で、連続性がなく急峻に0に変化するデータは欠測または不良データである。

3. おわりに

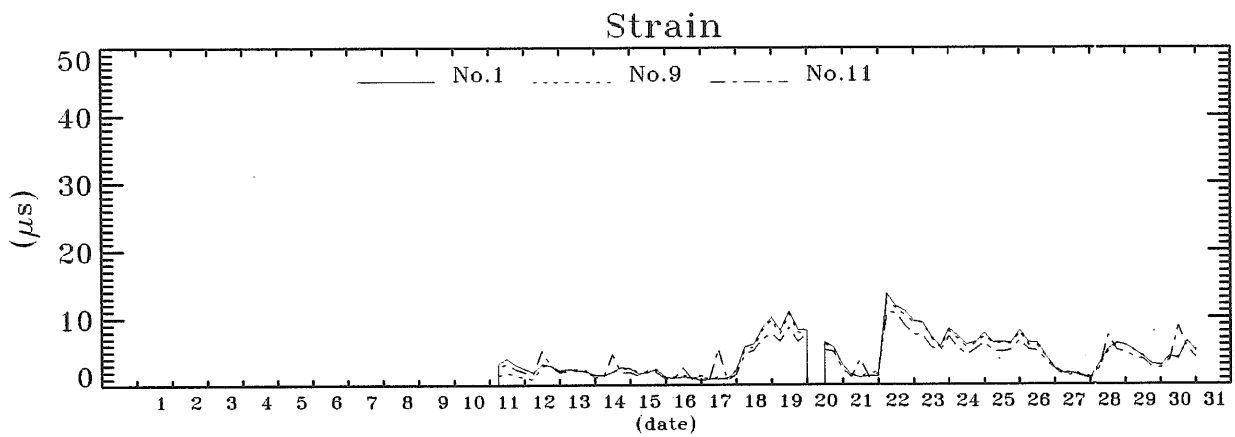
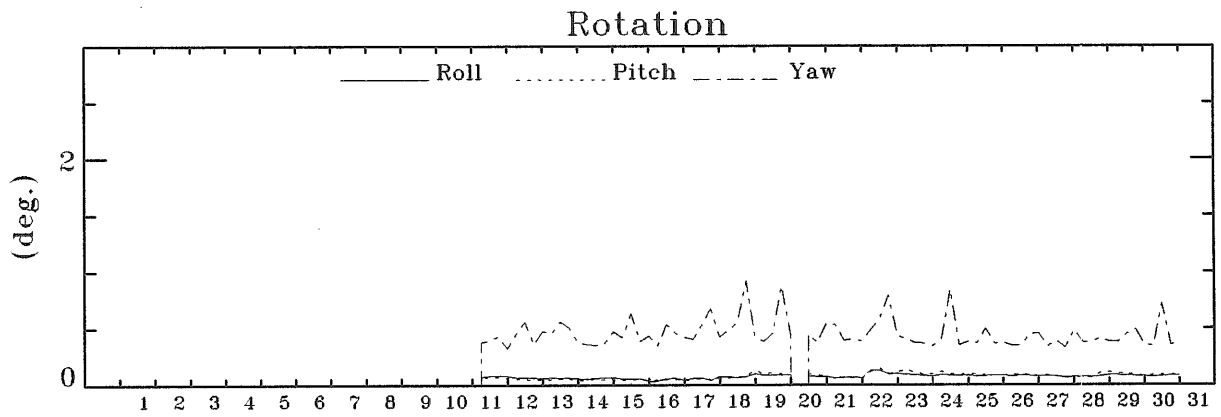
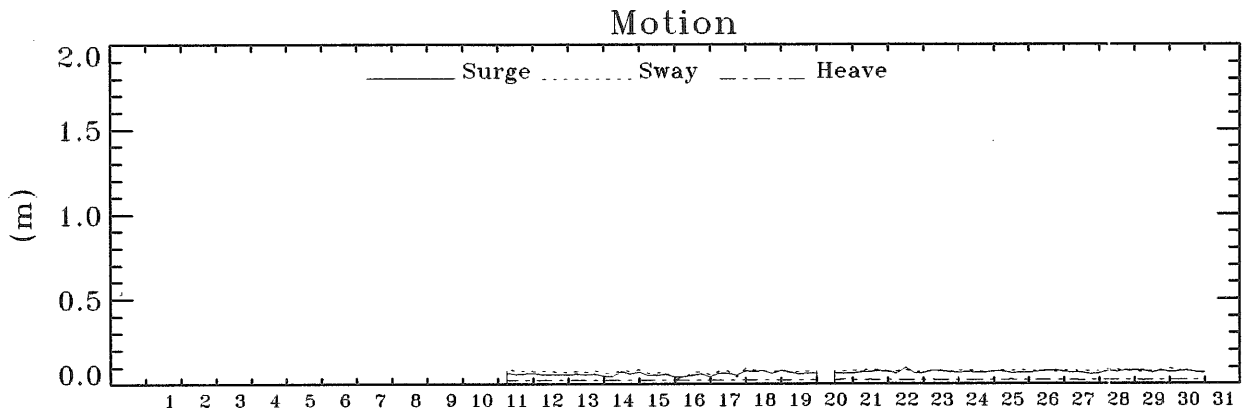
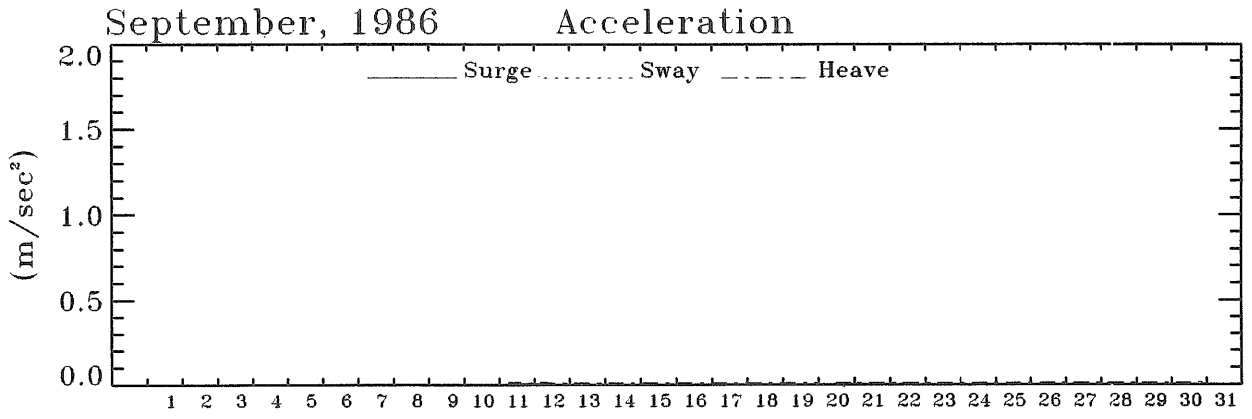
実質4年間の実海域実験を通して得られた定時計測データから、その代表例を定時計測毎の統計値として時系列図にして示した。これらの図から、季節毎の海象、各種応答の変化の様子や、それぞれの相関の様子が見て取れる。計測器の故障、計測システムの変更作業などによる欠測以外に、経時変化に連続性がないと判断したデータは人為的に省いている。これらの原因の多くは、スパイク状ノイズや温度影響などによるドリフトが原因である。これらを除いた解析も可能ではあるが、データ数が膨大である事、不良データを補うだけのデータが他に得られている事などから、今回は行っていない。本時系列図で示されたデータは数値化され、広く利用できるようなフロッピーディスクに納められている。希望者には、これらのデータを提供する事とした。詳細は付録に述べる。

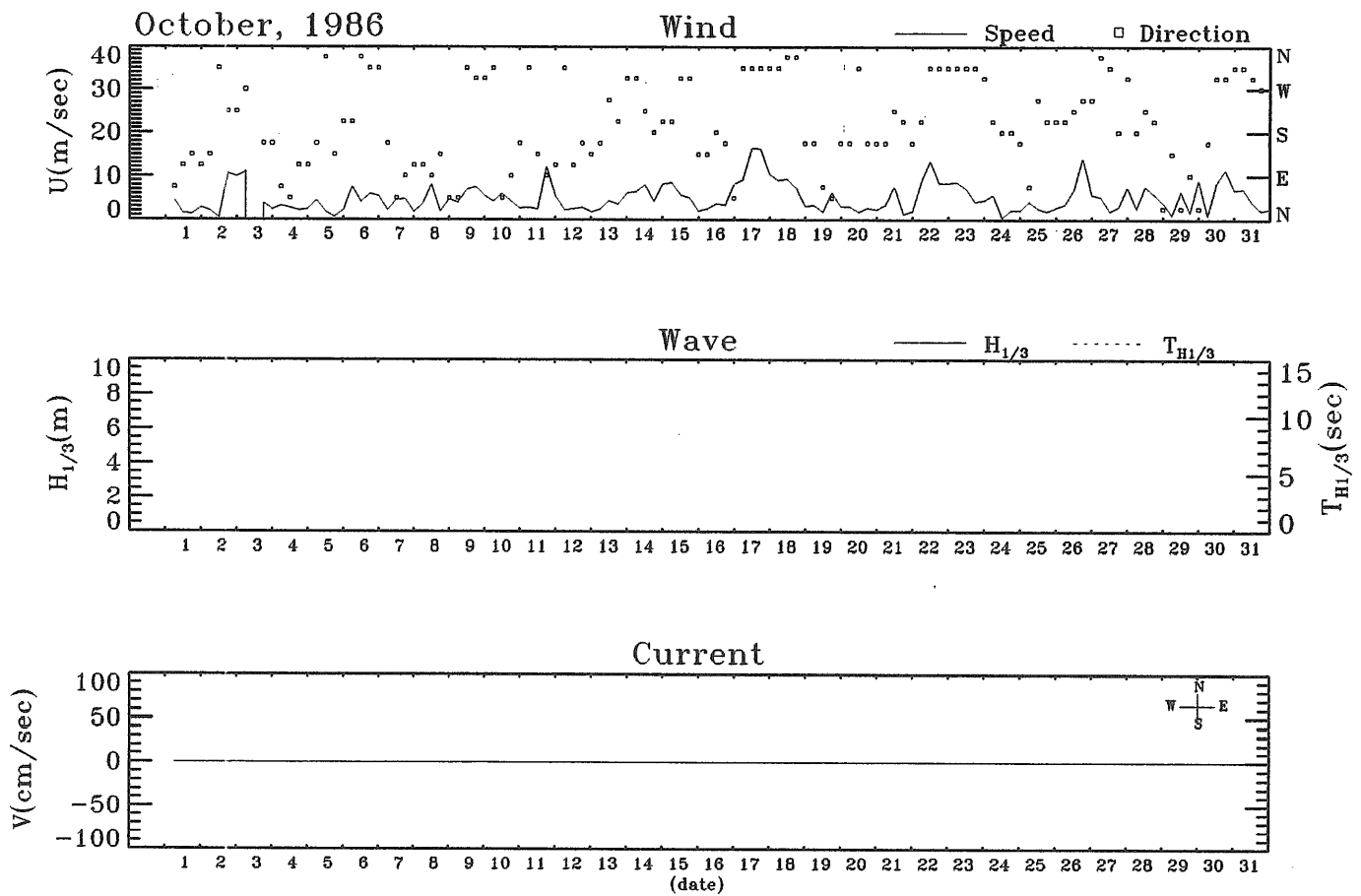
* 海洋開発工学部



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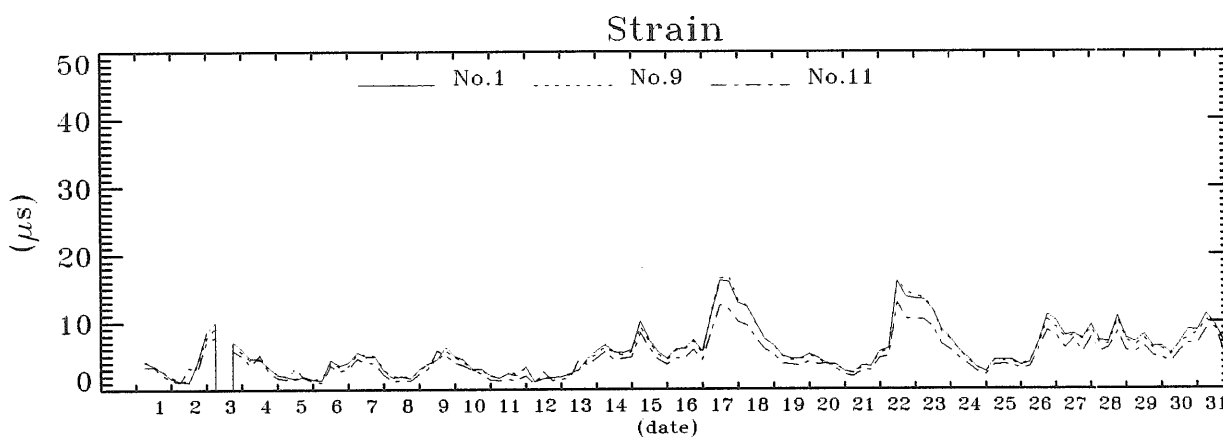
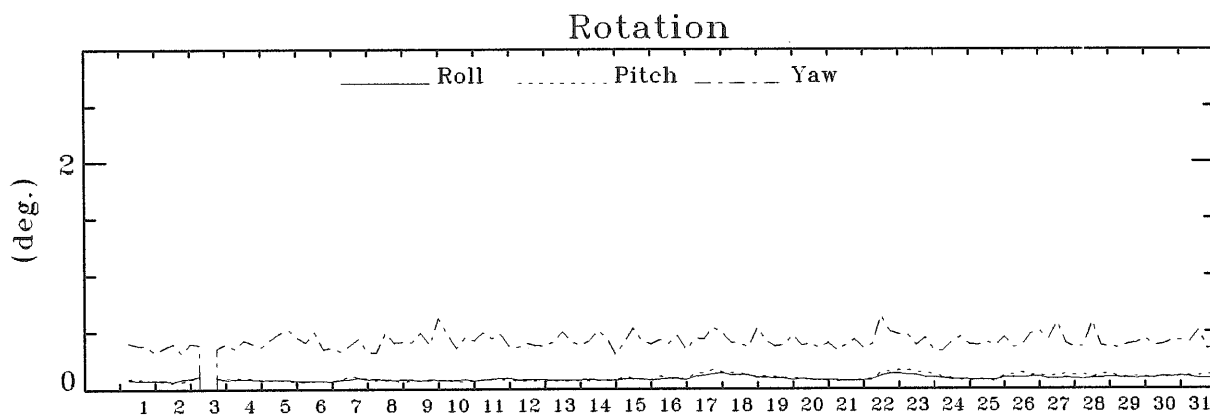
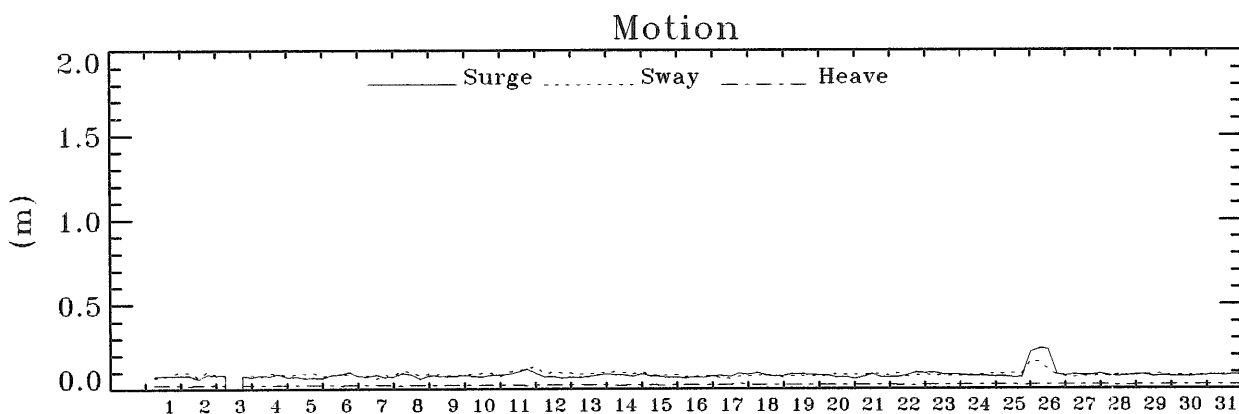
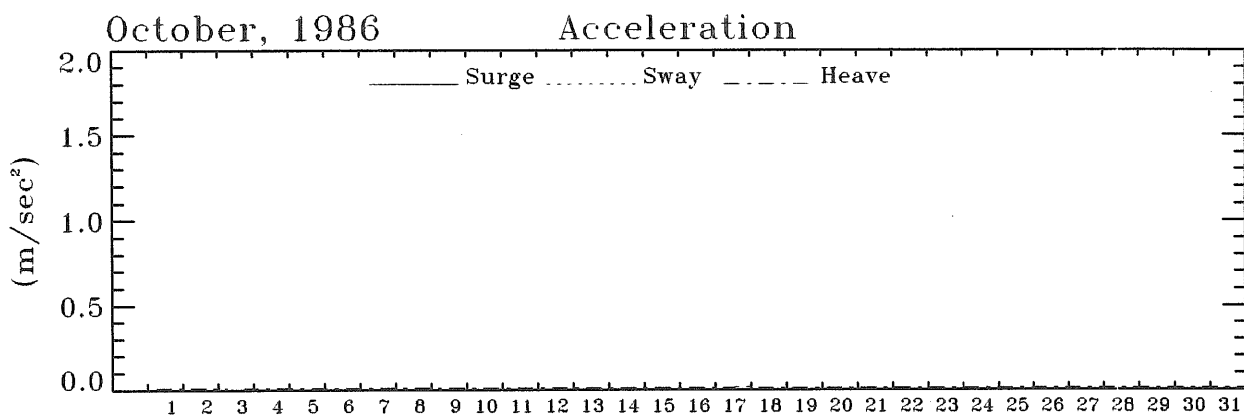
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*** 月の統計量 <<< 1986 年 9 月 >>> ***
I T E M      :      Mean      Maximum      Std.Dev.      測得率(%)
-----
Wind Speed (mean)          5.1197      18.0900      3.2864        65.83
Wave Hight( $H_{1/3}$ )          ---          ---          ---            .00
Wave Period( $T_{H_{1/3}}$ )      ---          ---          ---            .00
Current Speed (mean)      ---          ---          ---            .00
  (every hour)            ---          ---          ---            .00
Surge Acc.(Std.Dev.)      .0030       .0058       .0005         65.83
Sway Acc.(Std.Dev.)       .0028       .0029       .0001         65.83
Heave Acc.(Std.Dev.)     .0118       .0134       .0004         65.83
Surge Motion(Std.Dev.)   .0653       .0961       .0104         65.83
Sway Motion(Std.Dev.)    .0751       .0968       .0102         65.83
Heave Motion(Std.Dev.)   .0238       .0262       .0012         65.83
Roll Motion(Std.Dev.)    .0714       .1280       .0162         65.83
Pitch Motion(Std.Dev.)   .0765       .1455       .0244         65.83
Yaw Motion(Std.Dev.)     .4507       .9205       .1231         65.83
Strain No. 1(Std.Dev.)   4.4386     13.5100     3.0605         65.83
Strain No. 9(Std.Dev.)   4.2875     12.4700     2.9335         65.83
Strain No.11(Std.Dev.)   4.0318     10.8000     2.4814         65.83
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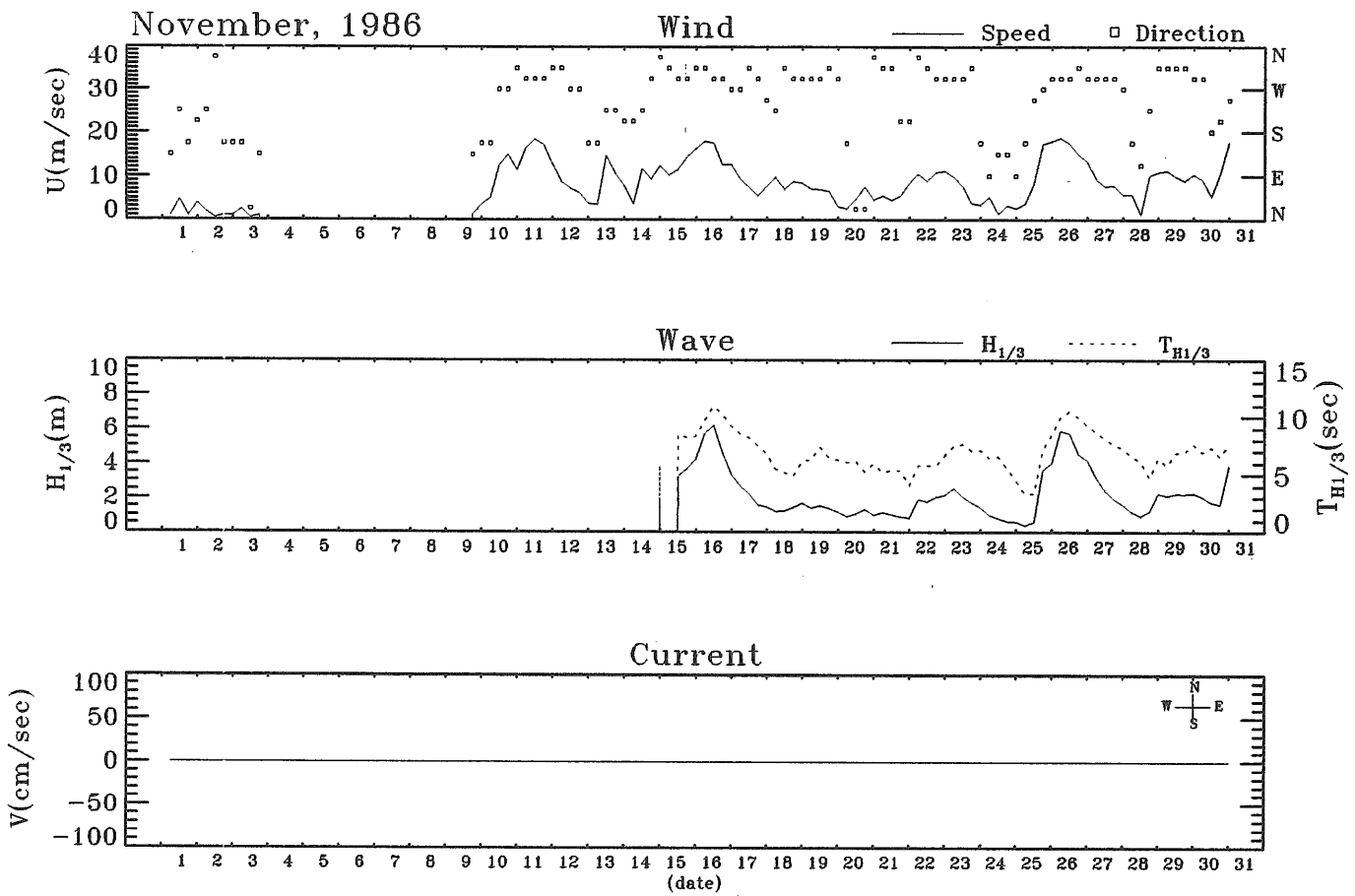




*** 月の統計量 <<< 1986 年 10 月 >>> ***

| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
|--|--------|---------|----------|--------|
| Wind Speed (mean) | 4.9504 | 16.3600 | 3.2829 | 99.19 |
| Wave Hight(H _{1/3}) | --- | --- | --- | .00 |
| Wave Period(T _{H_{1/3}}) | --- | --- | --- | .00 |
| Current Speed (mean) (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0027 | .0029 | .0001 | 99.19 |
| Sway Acc.(Std.Dev.) | .0026 | .0027 | .0001 | 99.19 |
| Heave Acc.(Std.Dev.) | .0118 | .0153 | .0005 | 99.19 |
| Surge Motion(Std.Dev.) | .0801 | .2356 | .0251 | 99.19 |
| Sway Motion(Std.Dev.) | .0853 | .1632 | .0148 | 99.19 |
| Heave Motion(Std.Dev.) | .0229 | .0342 | .0016 | 99.19 |
| Roll Motion(Std.Dev.) | .0867 | .1379 | .0148 | 99.19 |
| Pitch Motion(Std.Dev.) | .0952 | .1678 | .0253 | 99.19 |
| Yaw Motion(Std.Dev.) | .4162 | .6381 | .0631 | 99.19 |
| Strain No. 1(Std.Dev.) | 5.6947 | 16.1300 | 3.4058 | 99.19 |
| Strain No. 9(Std.Dev.) | 5.5973 | 16.7400 | 3.3853 | 99.19 |
| Strain No.11(Std.Dev.) | 4.6620 | 12.8800 | 2.6258 | 99.19 |

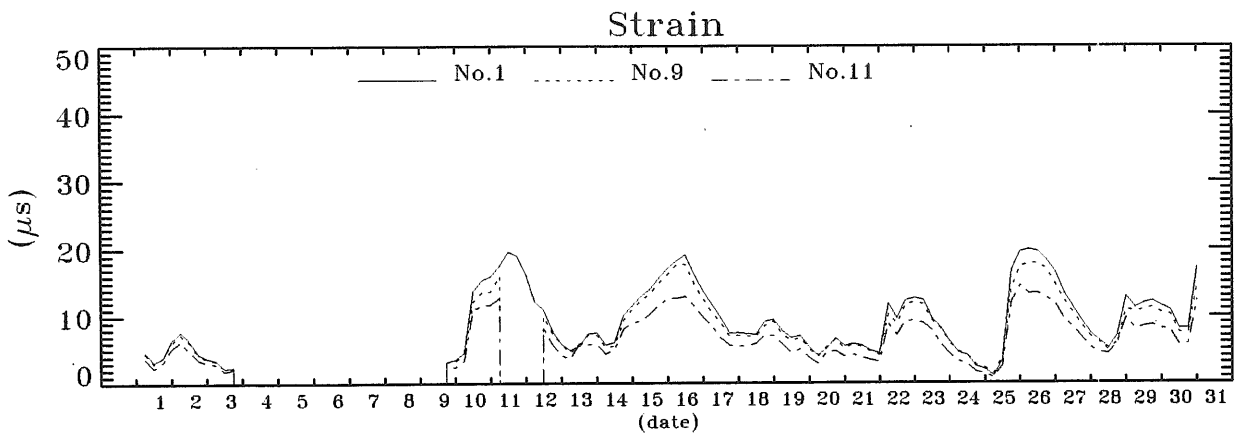
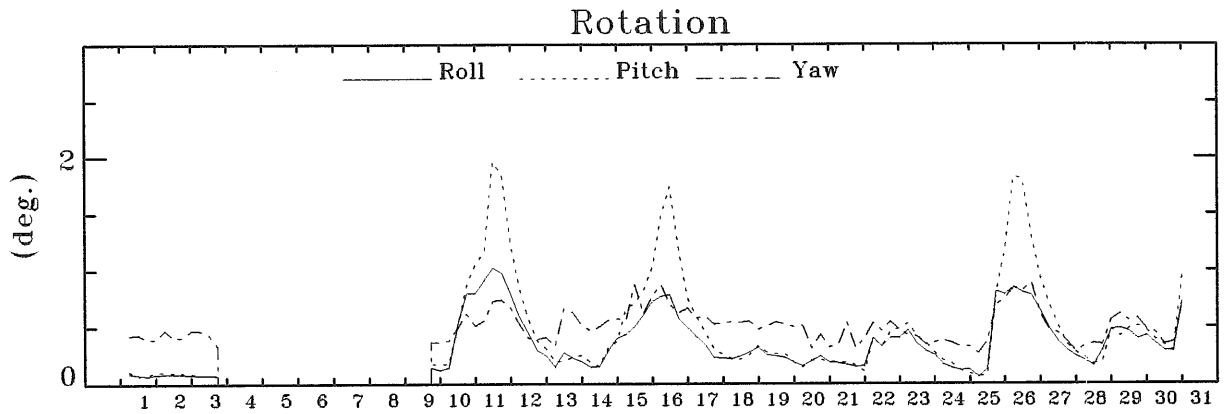
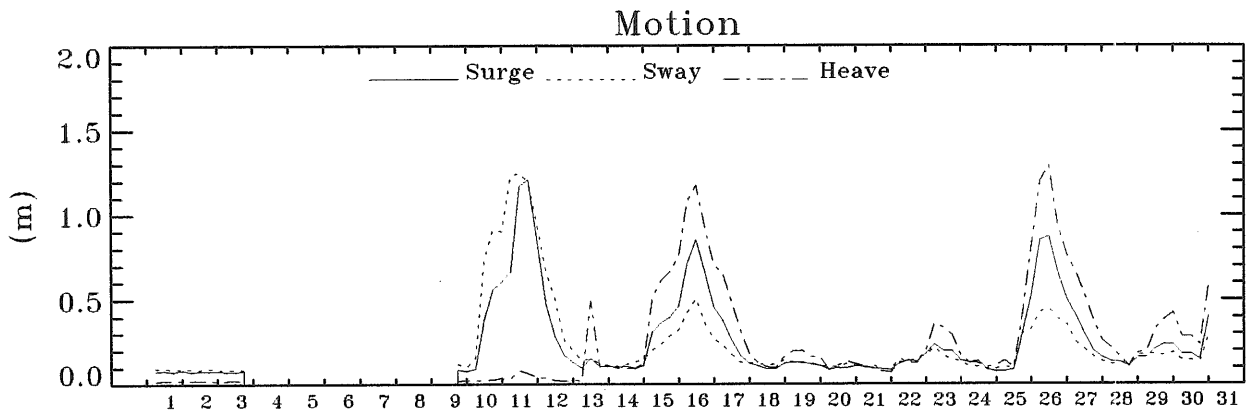
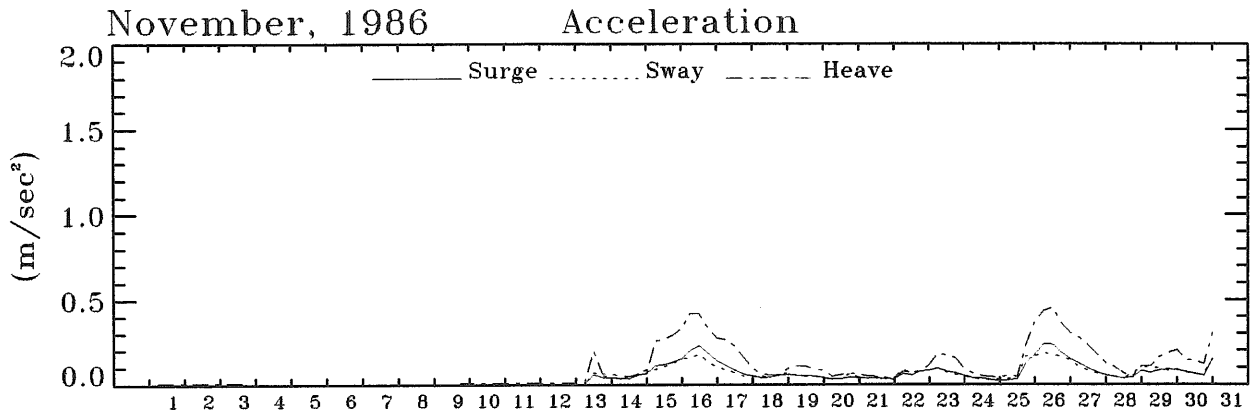


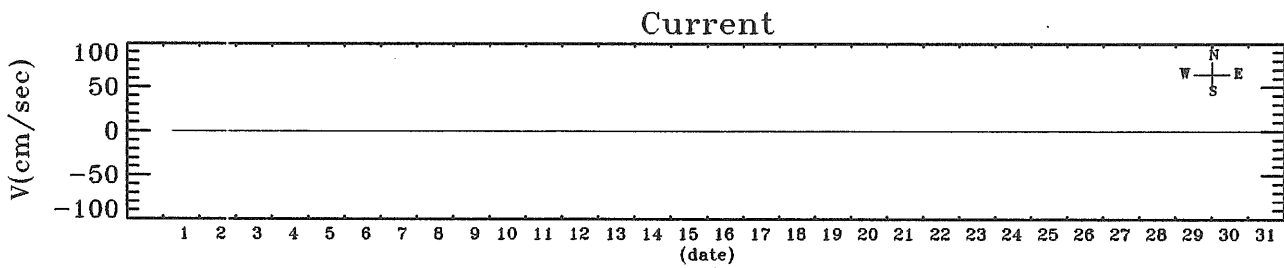
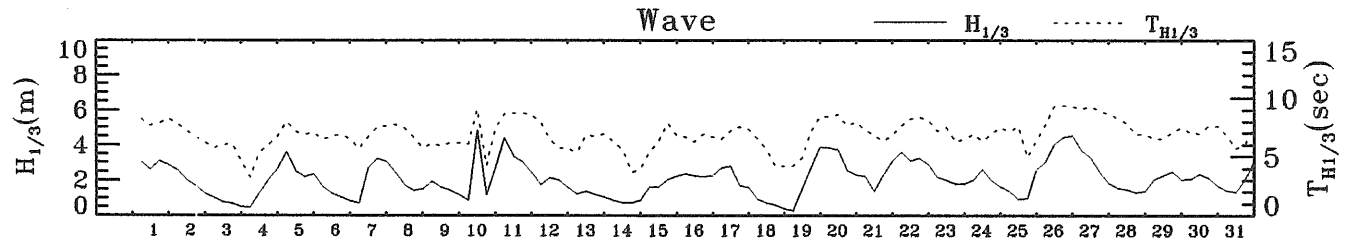
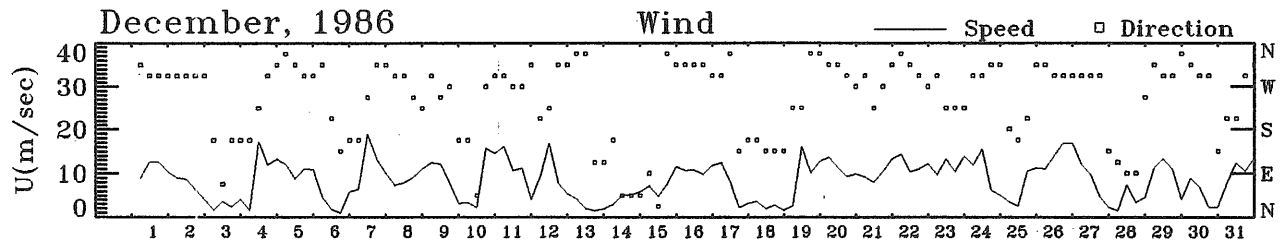


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 *** 月の統計量 <<< 1986 年 11 月 >>> ***
 I T E M : Mean Maximum Std.Dev. 測得率(%)

| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
|------------------------------|--------|---------|----------|--------|
| Wind Speed (mean) | 8.3054 | 18.6700 | 4.9464 | 80.83 |
| Wave Hight($H_{1/3}$) | 2.1834 | 6.1600 | 1.3992 | 53.33 |
| Wave Period($T_{H_{1/3}}$) | 6.9441 | 10.9600 | 1.6556 | 53.33 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0574 | .2338 | .0565 | 80.83 |
| Sway Acc.(Std.Dev.) | .0565 | .1840 | .0488 | 80.83 |
| Heave Acc.(Std.Dev.) | .1143 | .4522 | .1154 | 80.83 |
| Surge Motion(Std.Dev.) | .2485 | 1.2080 | .2456 | 80.83 |
| Sway Motion(Std.Dev.) | .2376 | 1.2490 | .2493 | 80.83 |
| Heave Motion(Std.Dev.) | .2573 | 1.2910 | .2964 | 80.83 |
| Roll Motion(Std.Dev.) | .3510 | 1.0220 | .2442 | 80.83 |
| Pitch Motion(Std.Dev.) | .4752 | 1.9620 | .4515 | 80.83 |
| Yaw Motion(Std.Dev.) | .5024 | .8894 | .1438 | 80.83 |
| Strain No. 1(Std.Dev.) | 9.3729 | 19.8500 | 5.0258 | 80.83 |
| Strain No. 9(Std.Dev.) | 8.4682 | 17.8200 | 4.3030 | 77.50 |
| Strain No.11(Std.Dev.) | 6.6932 | 14.5400 | 3.4030 | 77.50 |

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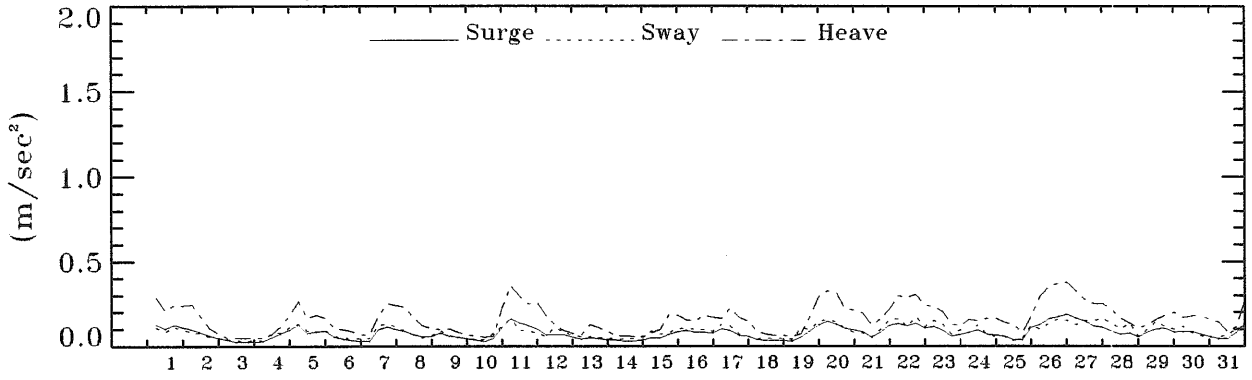




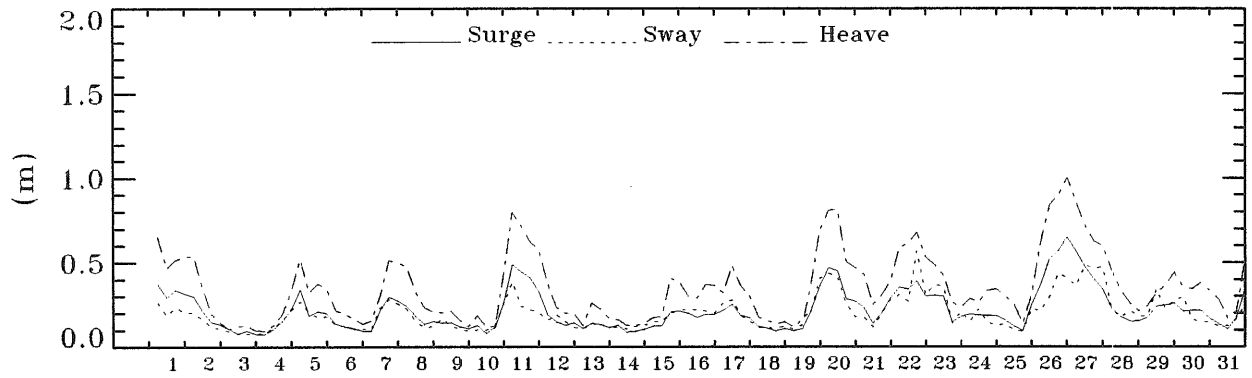
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*** 月の統計量 <<< 1986 年 12 月 >>> ***
I T E M      :      Mean      Maximum      Std.Dev.      測得率(%)
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Wind Speed (mean)      8.4767      18.8400      4.4569      100.00
Wave Hight(H_1/3)     2.0483      4.8300      .9633      100.00
Wave Period(T_H_1/3)  6.9051      9.3600      1.2453      100.00
Current Speed (mean)   ---         ---         ---         .00
    (every hour)      ---         ---         ---         .00
Surge Acc.(Std.Dev.)   .0766      .1859      .0371      100.00
Sway Acc.(Std.Dev.)    .0869      .1748      .0375      100.00
Heave Acc.(Std.Dev.)   .1636      .3762      .0833      100.00
Surge Motion(Std.Dev.) .2152      .6471      .1179      100.00
Sway Motion(Std.Dev.)  .2001      .5682      .0993      100.00
Heave Motion(Std.Dev.) .3507      1.0010     .2017      100.00
Roll Motion(Std.Dev.)  .3648      .8080      .1740      100.00
Pitch Motion(Std.Dev.) .4185      1.2570     .2405      100.00
Yaw Motion(Std.Dev.)   .4605      .8563      .1203      99.19
Strain No. 1(Std.Dev.) 9.6516     18.8100    4.1687     100.00
Strain No. 9(Std.Dev.) 8.6162     16.2400    3.5055     95.16
Strain No.11(Std.Dev.) 6.7857     12.9600    2.8460     95.16
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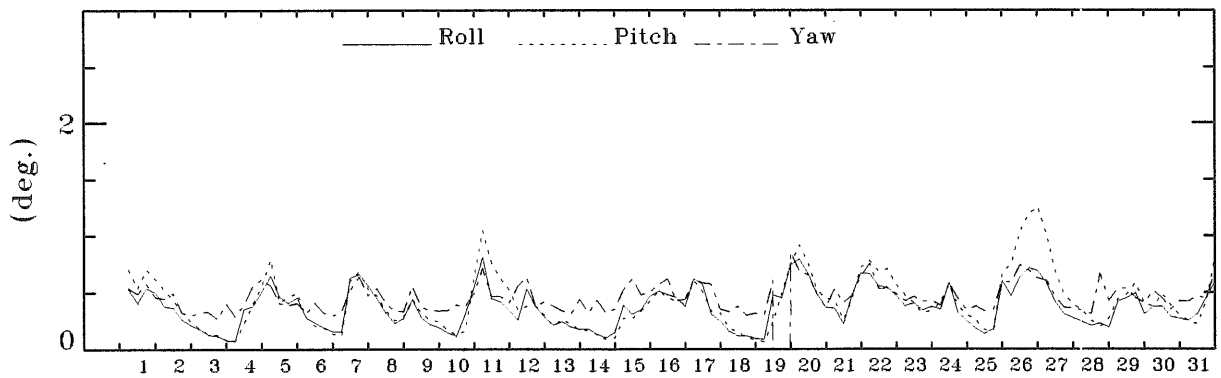

December, 1986 Acceleration



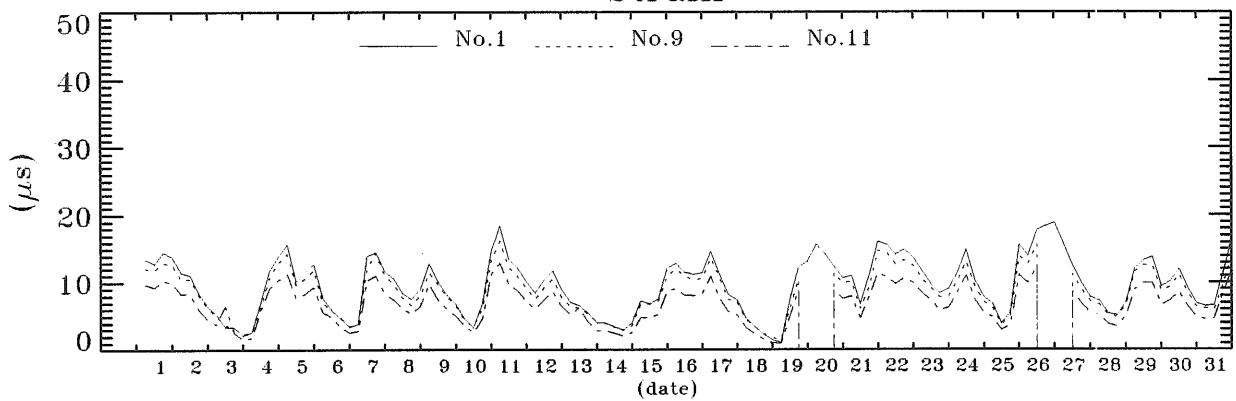
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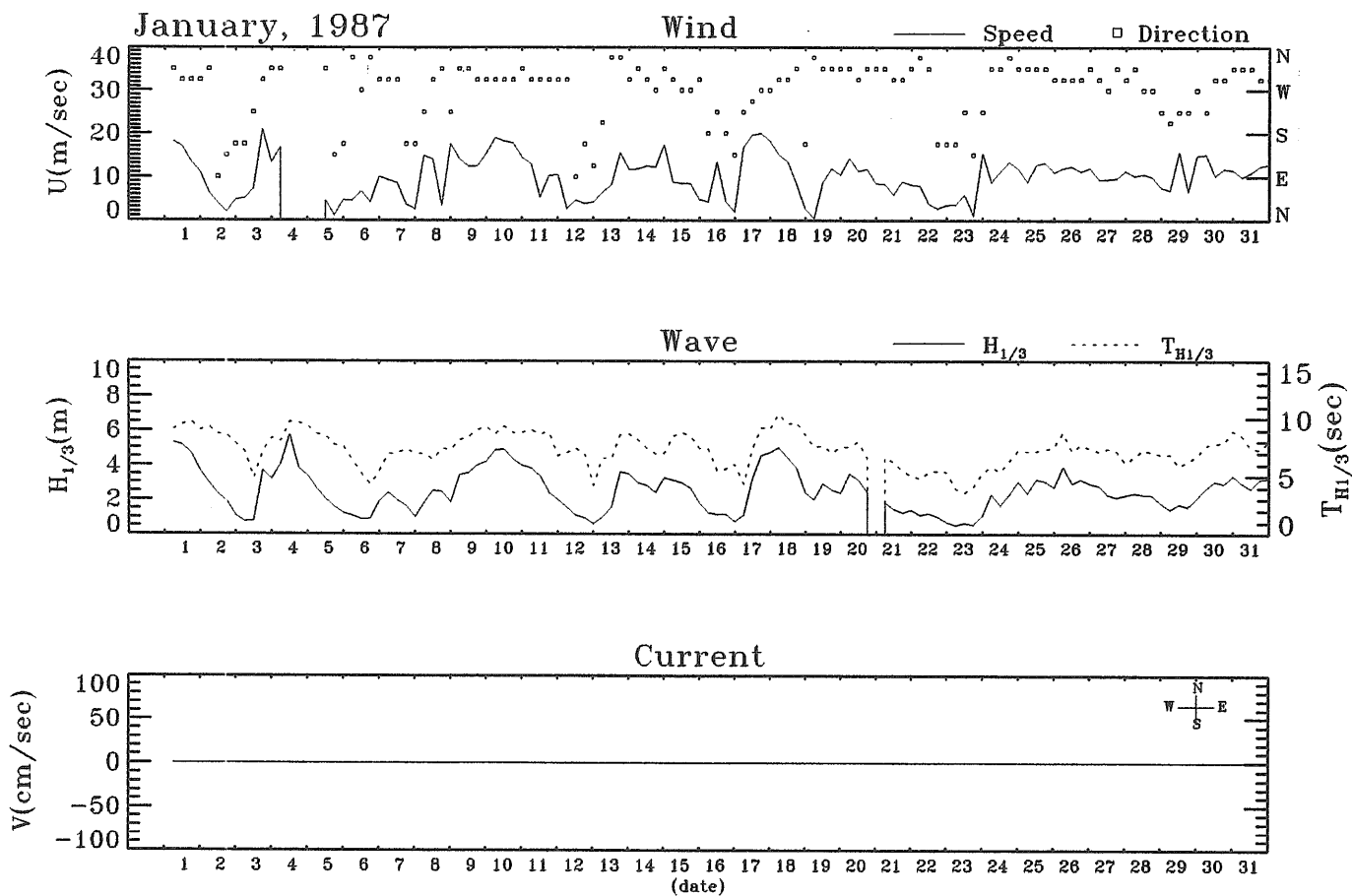


Rotation



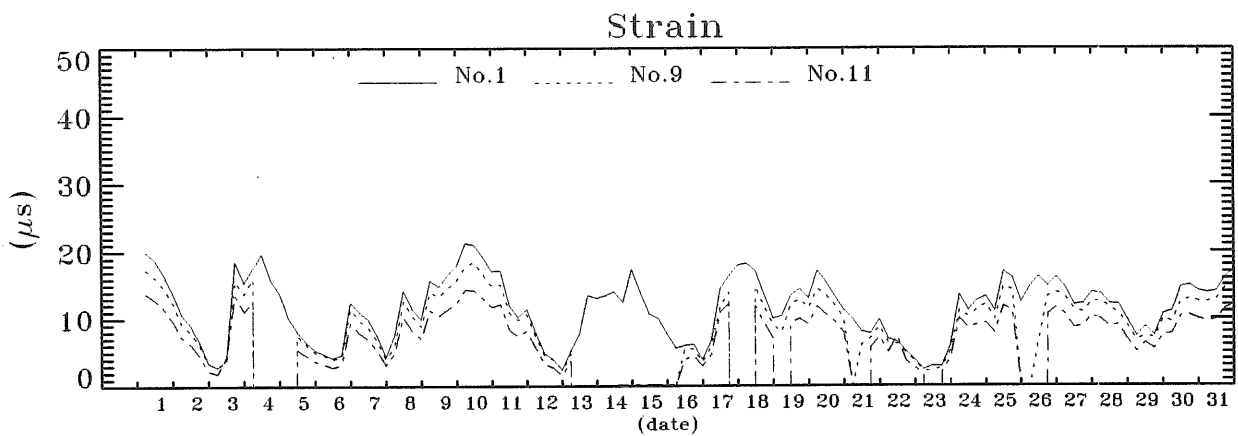
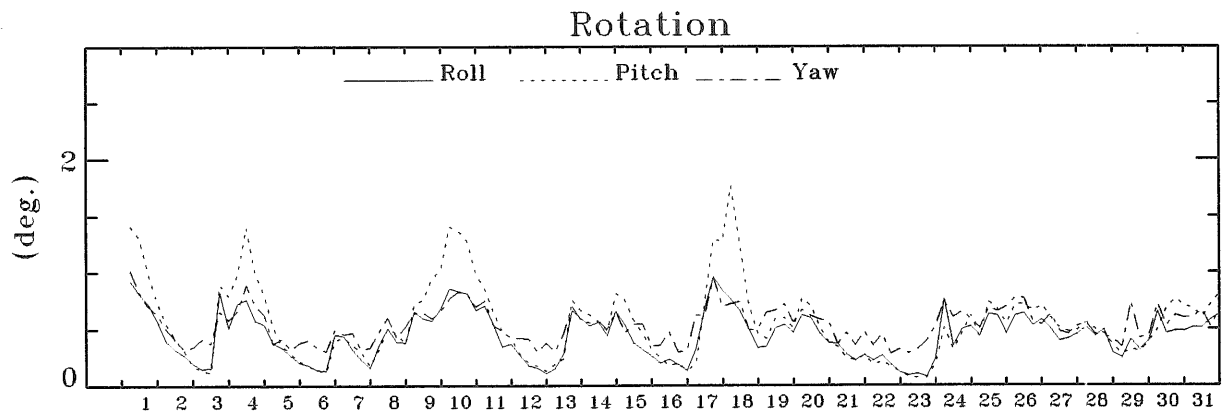
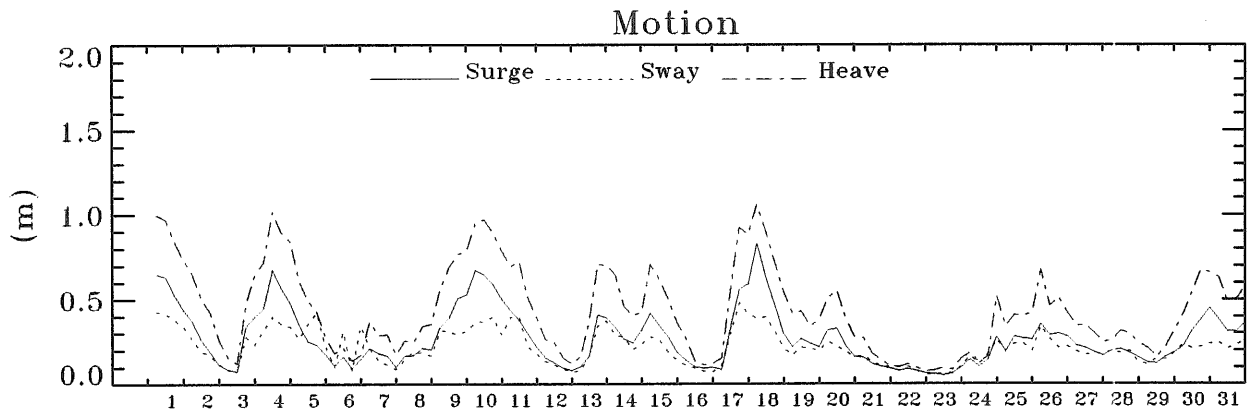
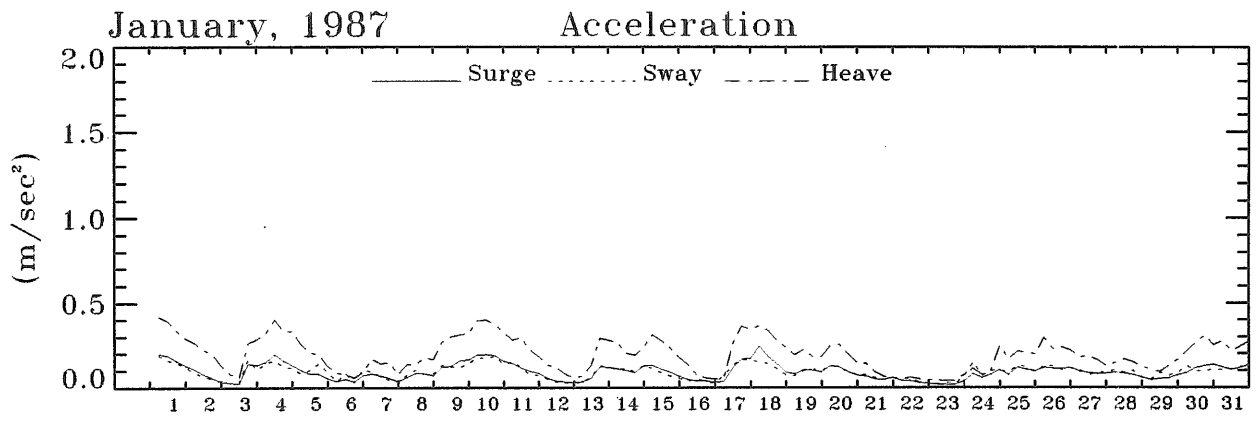
Strain

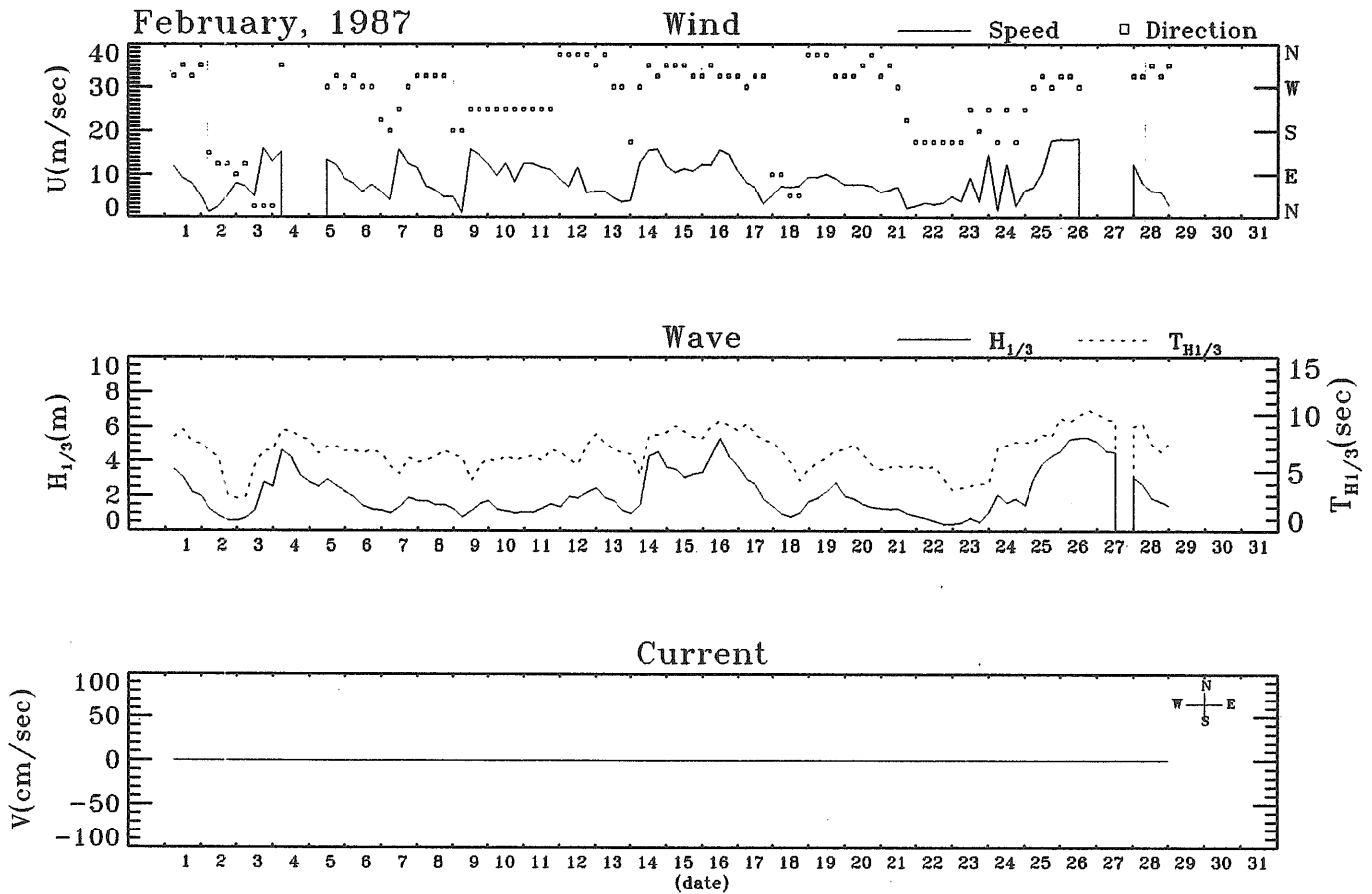




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 *** 月の統計量 <<< 1987 年 1 月 >>> ***
 I T E M : Mean Maximum Std.Dev. 測得率(%)

 Wind Speed (mean) 9.9827 20.8700 4.7694 96.77
 Wave Hight($H_{1/3}$) 2.4898 5.7400 1.1941 99.19
 Wave Period($T_{H_{1/3}}$) 7.3735 10.4300 1.4264 99.19
 Current Speed (mean) --- --- --- .00
 (every hour) --- --- --- .00
 Surge Acc.(Std.Dev.) .0920 .2440 .0471 100.00
 Sway Acc.(Std.Dev.) .0934 .1902 .0407 100.00
 Heave Acc.(Std.Dev.) .1967 .4207 .0985 100.00
 Surge Motion(Std.Dev.) .2703 .8272 .1654 100.00
 Sway Motion(Std.Dev.) .2185 .4796 .1017 100.00
 Heave Motion(Std.Dev.) .4381 1.0570 .2562 100.00
 Roll Motion(Std.Dev.) .4416 .9551 .2062 100.00
 Pitch Motion(Std.Dev.) .5497 1.7670 .3427 100.00
 Yaw Motion(Std.Dev.) .5397 1.0180 .1554 100.00
 Strain No. 1(Std.Dev.) 11.4826 21.2700 4.7249 100.00
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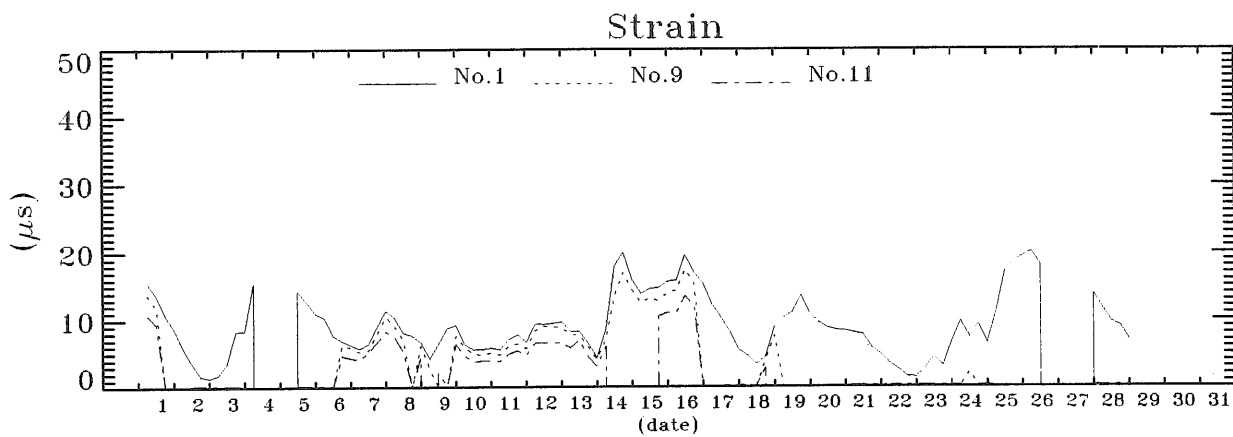
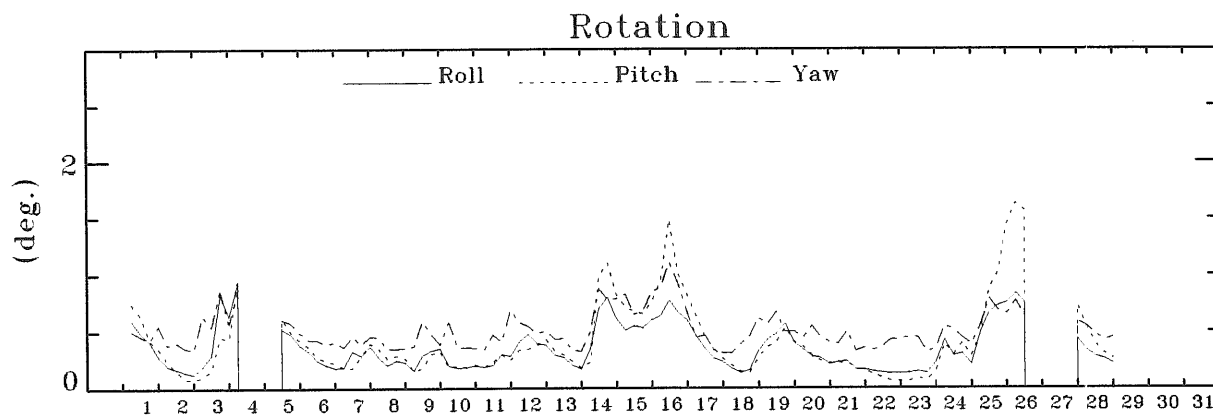
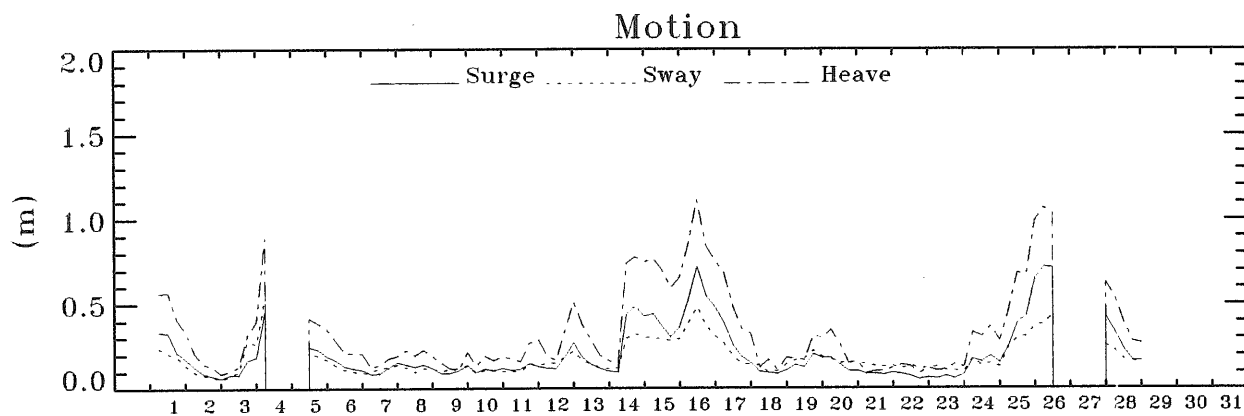
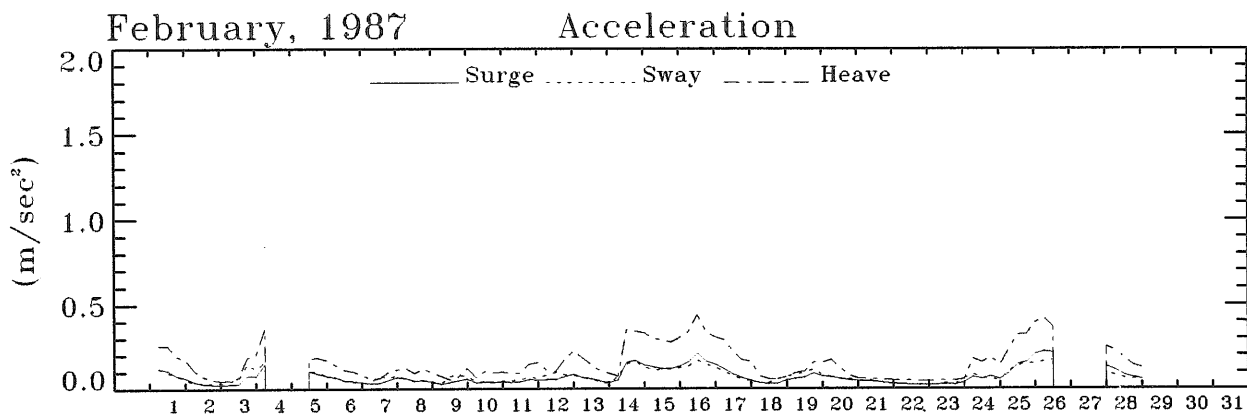


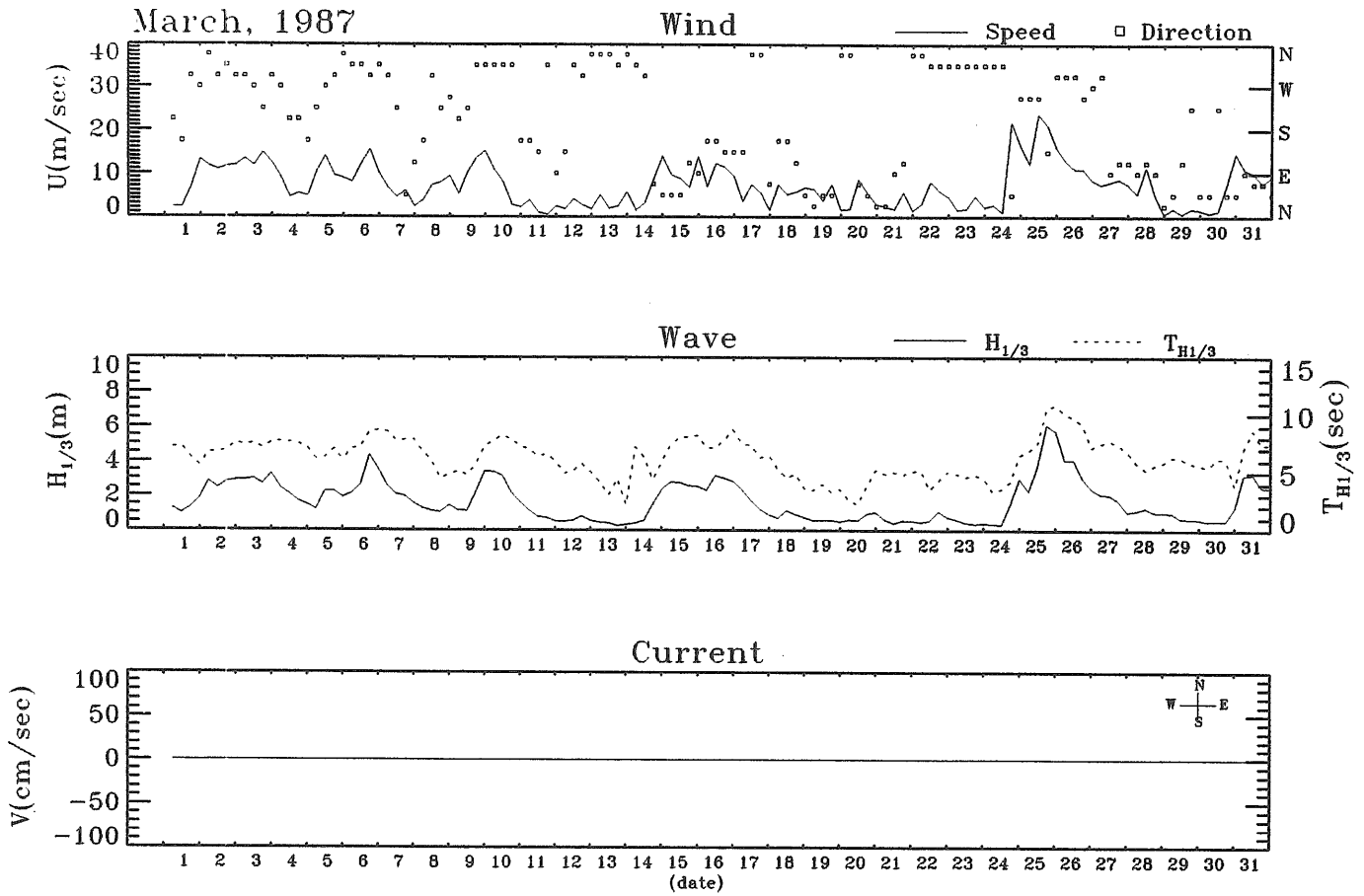


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 *** 月の統計量 <<< 1987 年 2 月 >>> ***
 I T E M : Mean Maximum Std.Dev. 測得率(%)
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| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
|---------------------------|--------|---------|----------|--------|
| Wind Speed (mean) | 8.7466 | 18.2500 | 4.3120 | 91.96 |
| Wave Hight($H_{1/3}$) | 2.1295 | 5.3400 | 1.2920 | 99.11 |
| Wave Period($T_{H1/3}$) | 6.8844 | 10.4300 | 1.6464 | 99.11 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0705 | .2181 | .0472 | 91.96 |
| Sway Acc.(Std.Dev.) | .0740 | .1699 | .0393 | 91.96 |
| Heave Acc.(Std.Dev.) | .1557 | .4385 | .1005 | 91.96 |
| Surge Motion(Std.Dev.) | .2017 | .7166 | .1553 | 91.96 |
| Sway Motion(Std.Dev.) | .1785 | .5431 | .0925 | 91.96 |
| Heave Motion(Std.Dev.) | .3384 | 1.1080 | .2524 | 91.96 |
| Roll Motion(Std.Dev.) | .3519 | .9295 | .1966 | 91.96 |
| Pitch Motion(Std.Dev.) | .4114 | 1.6300 | .3304 | 91.96 |
| Yaw Motion(Std.Dev.) | .5097 | 1.1070 | .1625 | 91.96 |
| Strain No. 1(Std.Dev.) | 9.1576 | 20.0900 | 4.5881 | 91.96 |
| Strain No. 9(Std.Dev.) | 3.6405 | 17.4700 | 4.9214 | 91.96 |
| Strain No.11(Std.Dev.) | 2.6429 | 13.5500 | 3.4974 | 80.36 |

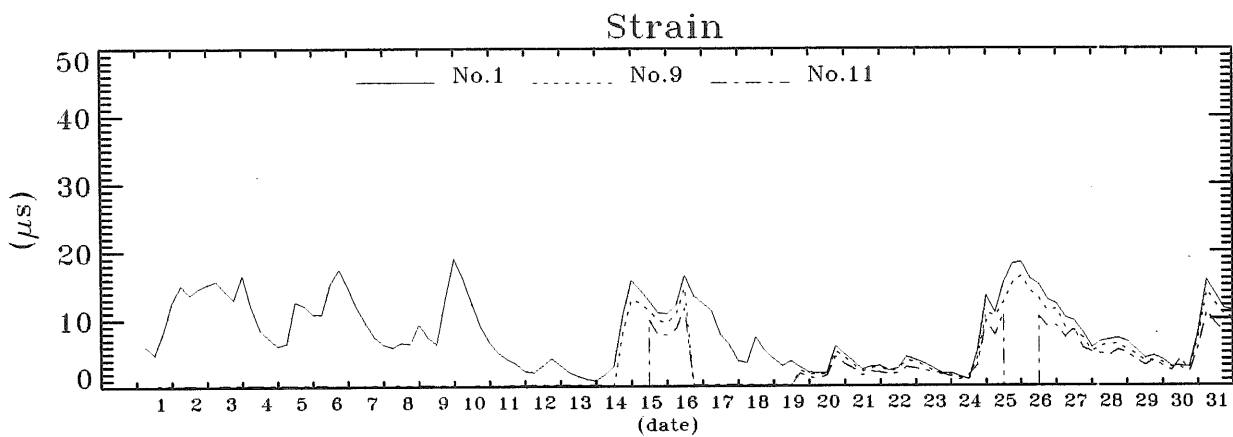
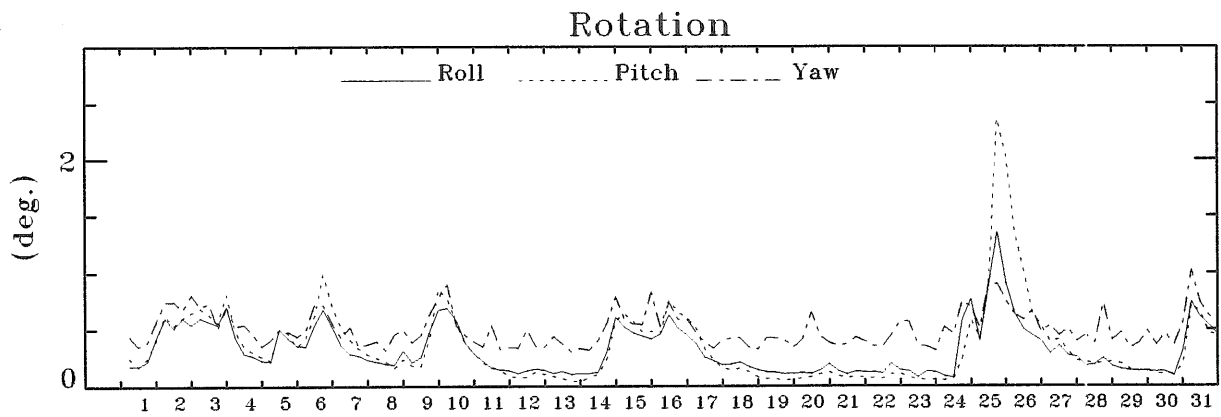
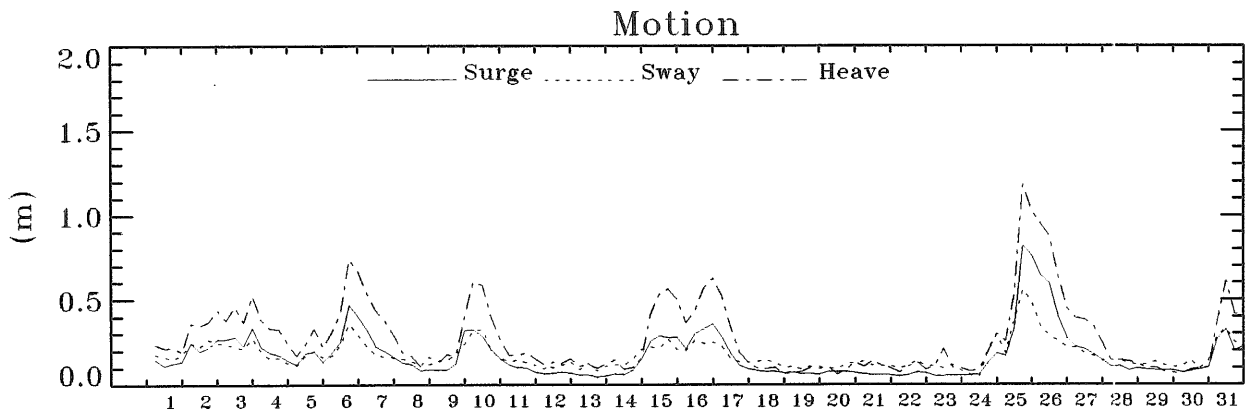
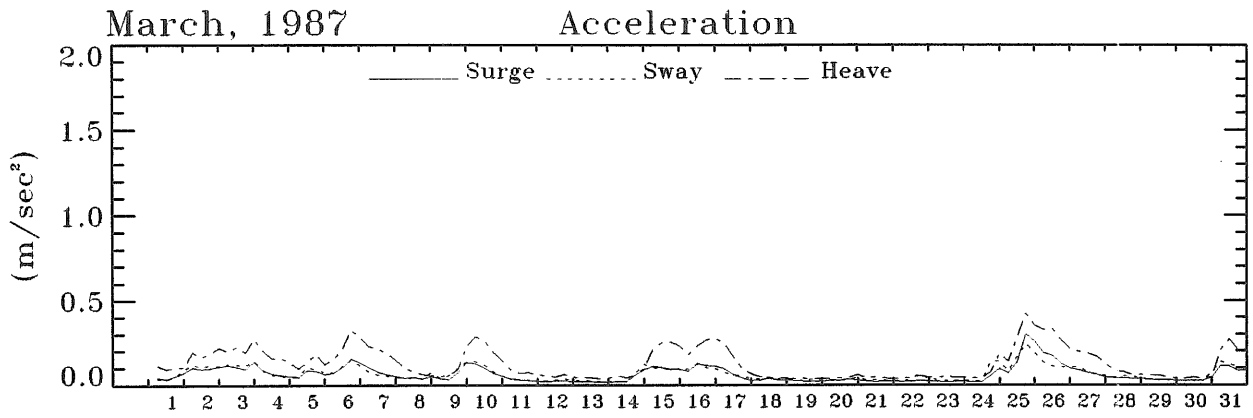
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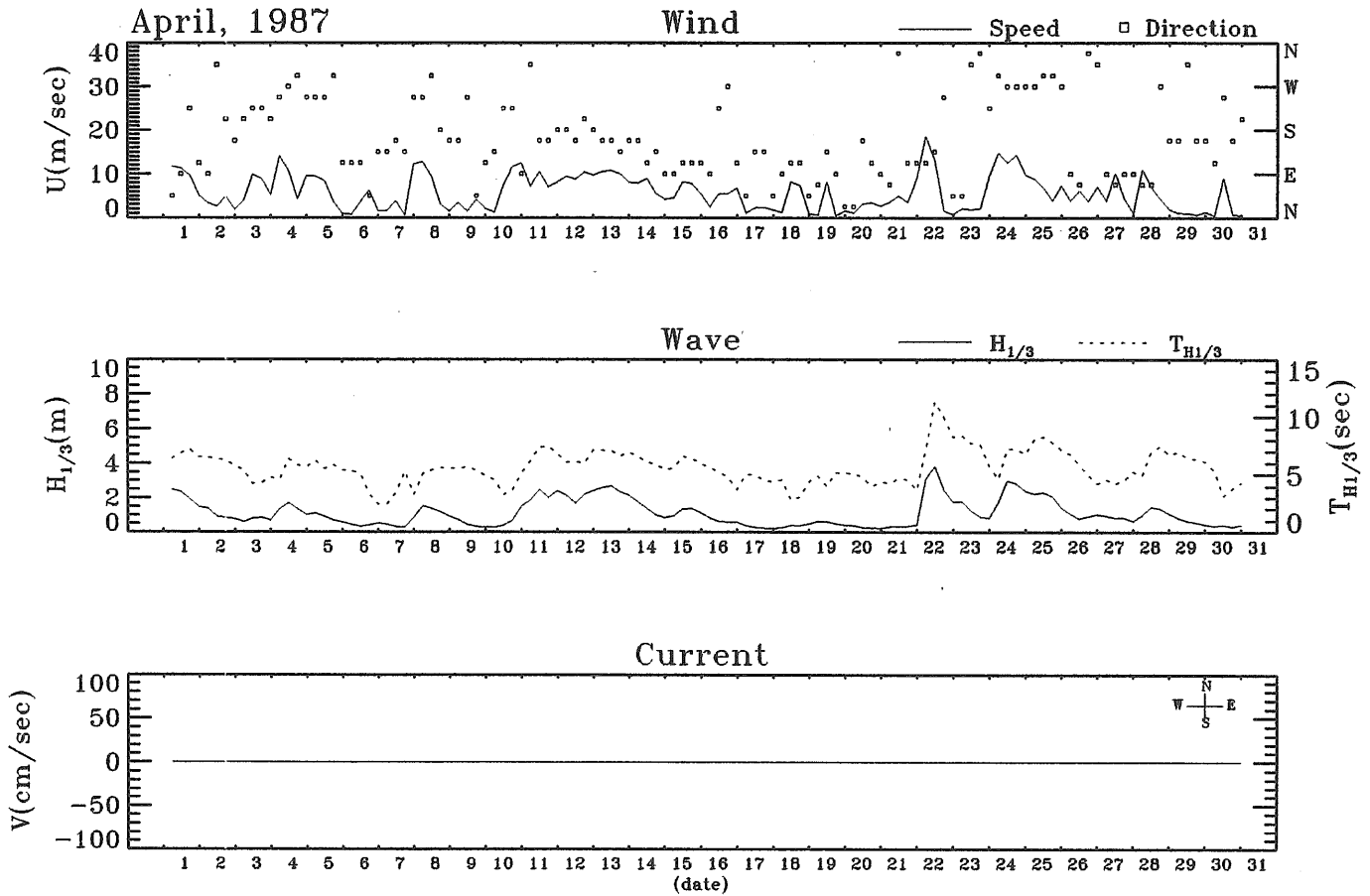




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***** 月の統計量 <<< 1987 年 3 月 >>> *****
 I T E M : Mean Maximum Std.Dev. 測得率(%)

 Wind Speed (mean) 7.2308 23.7000 4.8338 100.00
 Wave Hight($H_{1/3}$) 1.6603 6.0900 1.1640 100.00
 Wave Period($T_{H1/3}$) 6.2564 10.8300 1.7019 100.00
 Current Speed (mean) --- --- --- .00
 (every hour) --- --- --- .00
 Surge Acc.(Std.Dev.) .0617 .2984 .0477 100.00
 Sway Acc.(Std.Dev.) .0672 .2422 .0428 100.00
 Heave Acc.(Std.Dev.) .1282 .4206 .0913 100.00
 Surge Motion(Std.Dev.) .1690 .8167 .1373 100.00
 Sway Motion(Std.Dev.) .1752 .5565 .0809 100.00
 Heave Motion(Std.Dev.) .2754 1.1800 .2154 100.00
 Roll Motion(Std.Dev.) .3179 1.3500 .2207 100.00
 Pitch Motion(Std.Dev.) .3535 2.3560 .3485 100.00
 Yaw Motion(Std.Dev.) .5053 1.0220 .1551 100.00
 Strain No. 1(Std.Dev.) 8.0511 18.9300 4.9567 100.00
 Strain No. 9(Std.Dev.) 3.1818 16.3400 4.4991 100.00
 Strain No.11(Std.Dev.) 2.2705 11.6200 3.1692 95.16
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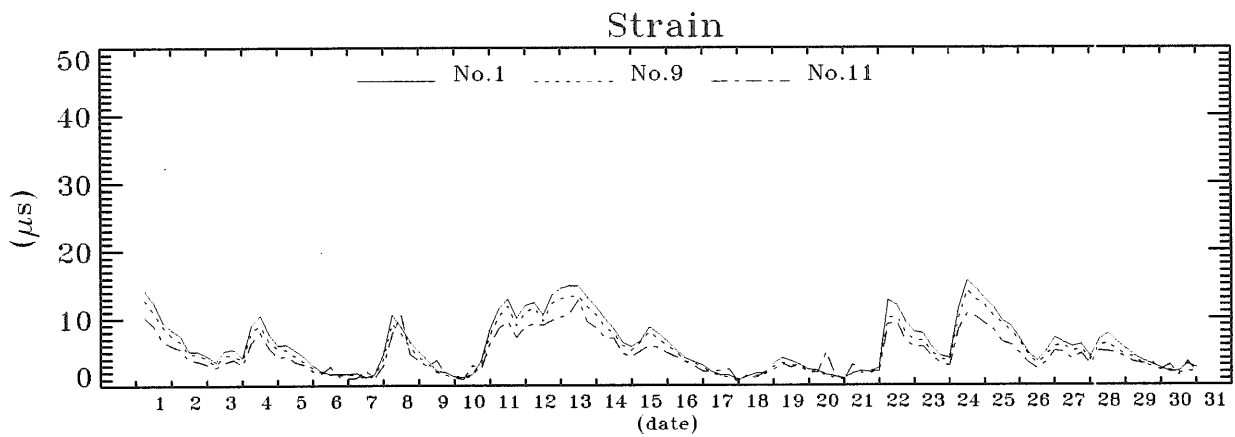
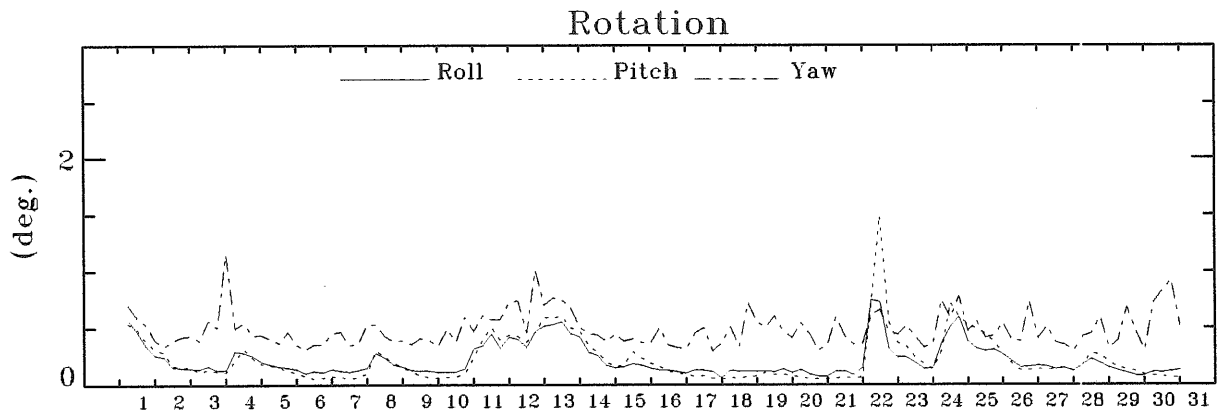
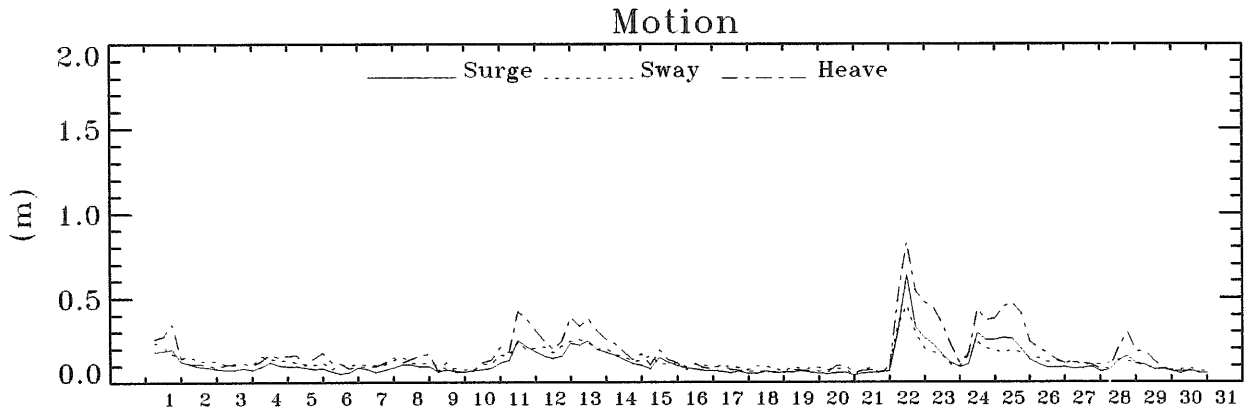
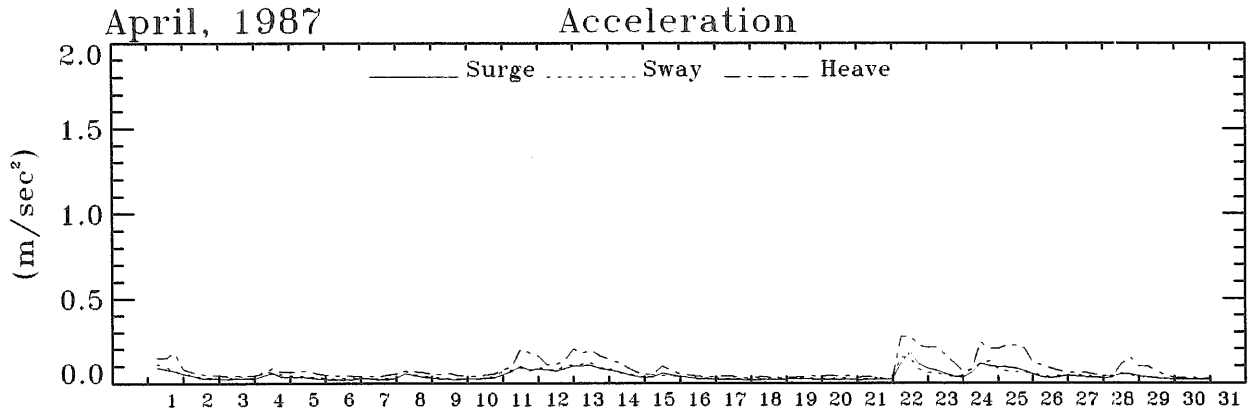


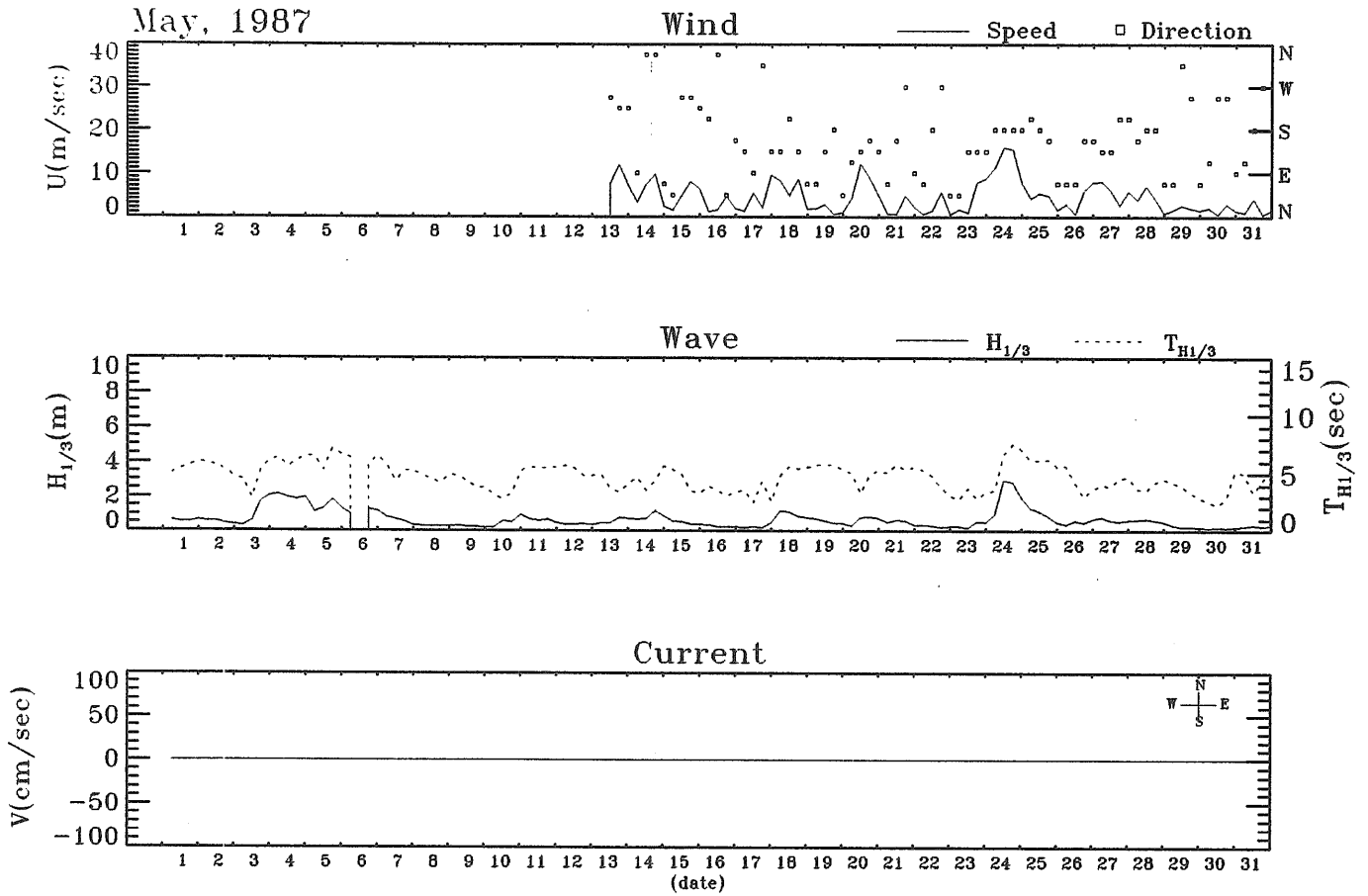


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 *** 月の統計量 <<< 1987 年 4 月 >>> ***
 I T E M : Mean Maximum Std.Dev. 測得率(%)
 =====

| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
|------------------------------|--------|---------|----------|--------|
| Wind Speed (mean) | 5.7749 | 18.4100 | 4.0419 | 100.00 |
| Wave Hight($H_{1/3}$) | 1.0937 | 3.8000 | .7842 | 100.00 |
| Wave Period($T_{H_{1/3}}$) | 5.6387 | 11.3400 | 1.4698 | 100.00 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0431 | .1774 | .0288 | 100.00 |
| Sway Acc.(Std.Dev.) | .0482 | .1525 | .0281 | 100.00 |
| Heave Acc.(Std.Dev.) | .0840 | .2752 | .0617 | 100.00 |
| Surge Motion(Std.Dev.) | .1156 | .6317 | .0800 | 100.00 |
| Sway Motion(Std.Dev.) | .1321 | .4577 | .0609 | 100.00 |
| Heave Motion(Std.Dev.) | .1745 | .8277 | .1322 | 100.00 |
| Roll Motion(Std.Dev.) | .2100 | .7400 | .1402 | 100.00 |
| Pitch Motion(Std.Dev.) | .2214 | 1.4900 | .2024 | 100.00 |
| Yaw Motion(Std.Dev.) | .4864 | 1.1560 | .1522 | 100.00 |
| Strain No. 1(Std.Dev.) | 6.0084 | 15.5400 | 3.9678 | 100.00 |
| Strain No. 9(Std.Dev.) | 5.3730 | 14.1600 | 3.5662 | 100.00 |
| Strain No.11(Std.Dev.) | 4.6620 | 12.7900 | 2.7984 | 100.00 |

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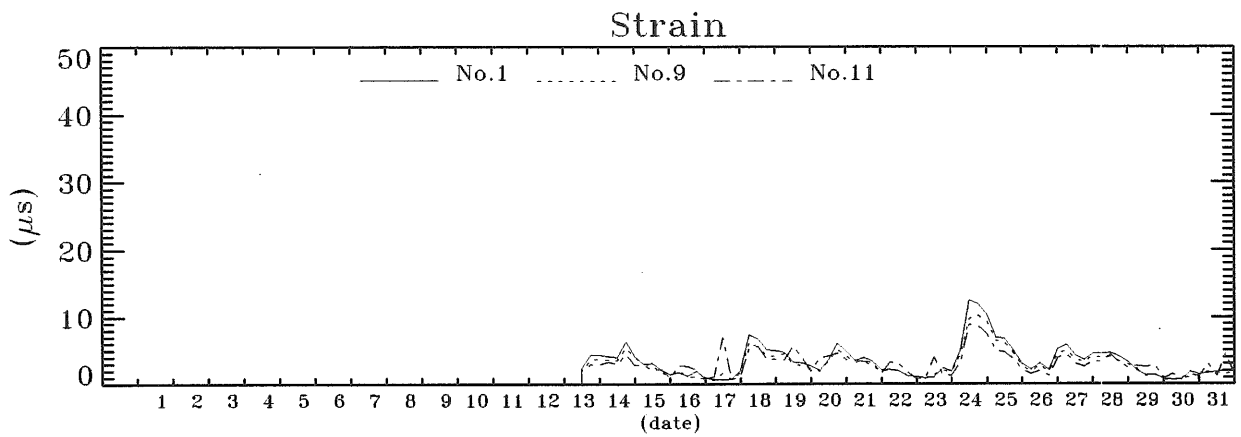
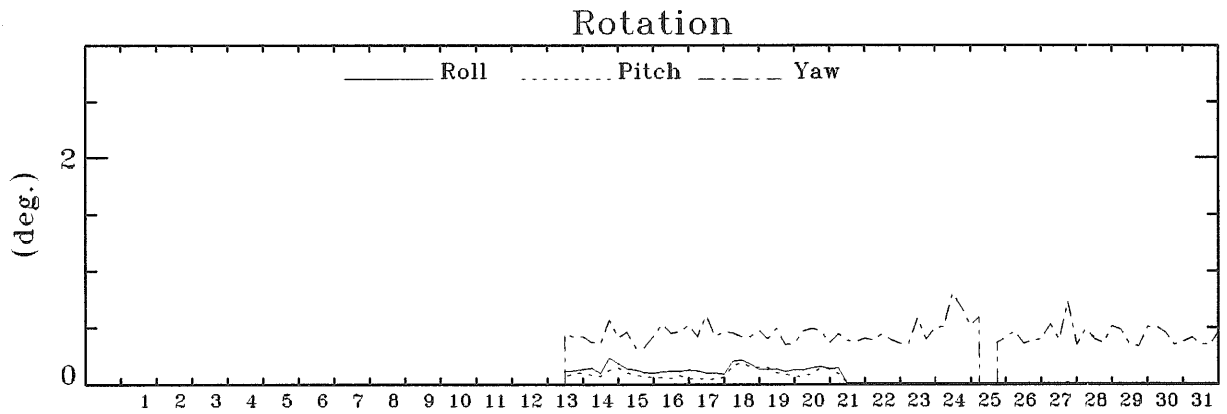
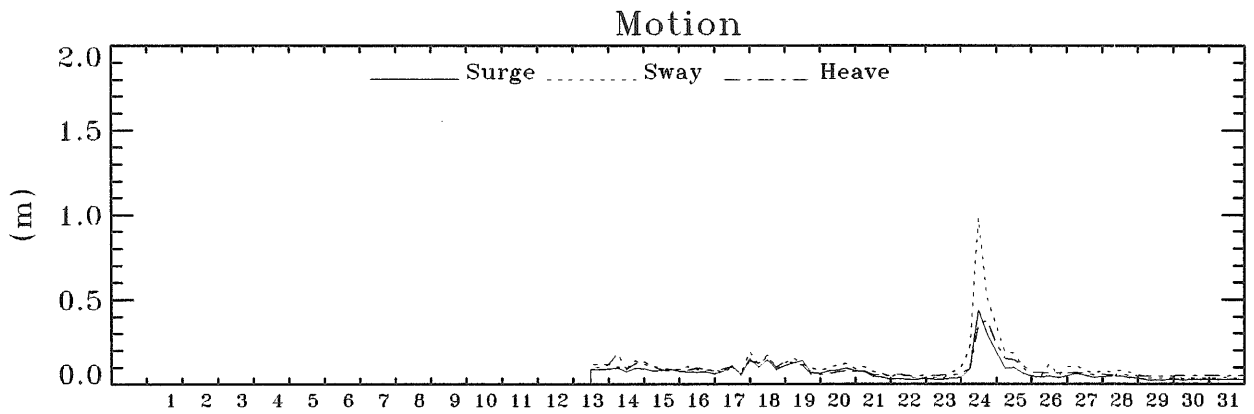
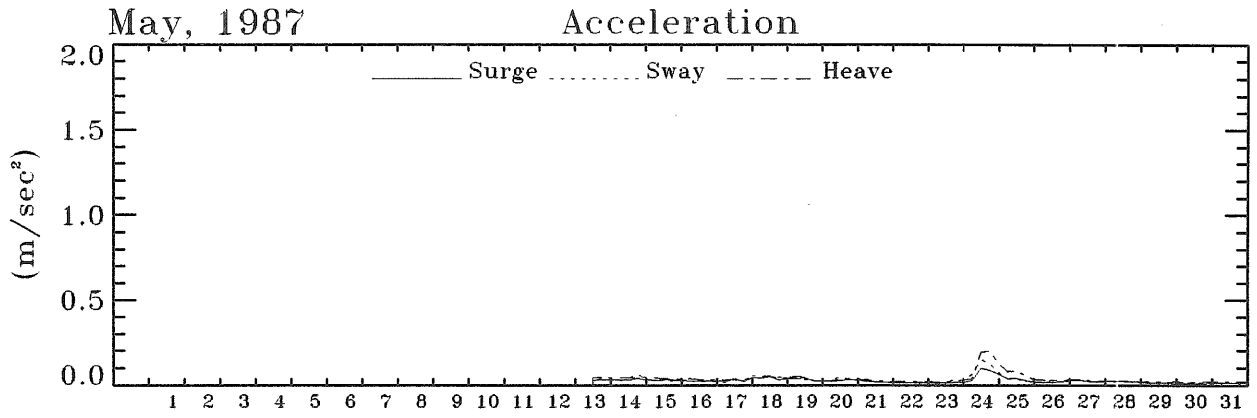


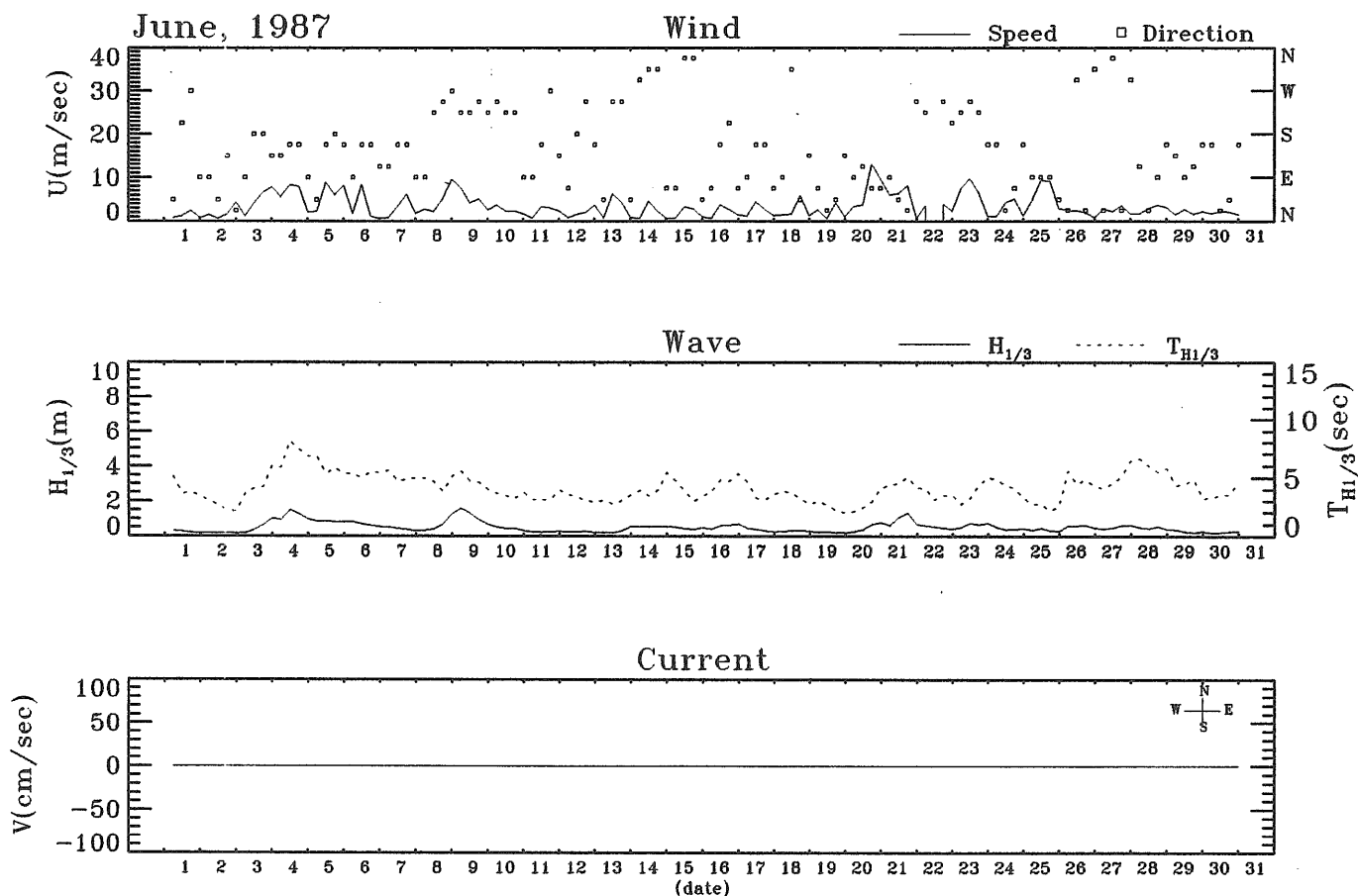


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 *** 月の統計量 <<< 1987 年 5 月 >>> ***
 I T E M : Mean Maximum Std.Dev. 測得率(%)

| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
|------------------------------|--------|---------|----------|--------|
| Wind Speed (mean) | 4.5031 | 15.9400 | 3.5992 | 60.48 |
| Wave Hight($H_{1/3}$) | .6691 | 2.9500 | .5241 | 99.19 |
| Wave Period($T_{H_{1/3}}$) | 4.7370 | 7.5200 | 1.1684 | 99.19 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0255 | .0980 | .0154 | 60.48 |
| Sway Acc.(Std.Dev.) | .0306 | .1510 | .0223 | 60.48 |
| Heave Acc.(Std.Dev.) | .0388 | .1997 | .0311 | 60.48 |
| Surge Motion(Std.Dev.) | .0701 | .4354 | .0610 | 60.48 |
| Sway Motion(Std.Dev.) | .1053 | .9799 | .1235 | 60.48 |
| Heave Motion(Std.Dev.) | .0885 | .3760 | .0591 | 60.48 |
| Roll Motion(Std.Dev.) | .0596 | .2309 | .0667 | 60.48 |
| Pitch Motion(Std.Dev.) | .0478 | .1896 | .0485 | 60.48 |
| Yaw Motion(Std.Dev.) | .4433 | .8005 | .0896 | 59.68 |
| Strain No. 1(Std.Dev.) | 3.3522 | 12.4800 | 2.4049 | 60.48 |
| Strain No. 9(Std.Dev.) | 3.0021 | 10.2200 | 2.0189 | 60.48 |
| Strain No.11(Std.Dev.) | 3.0323 | 8.8280 | 1.7178 | 60.48 |

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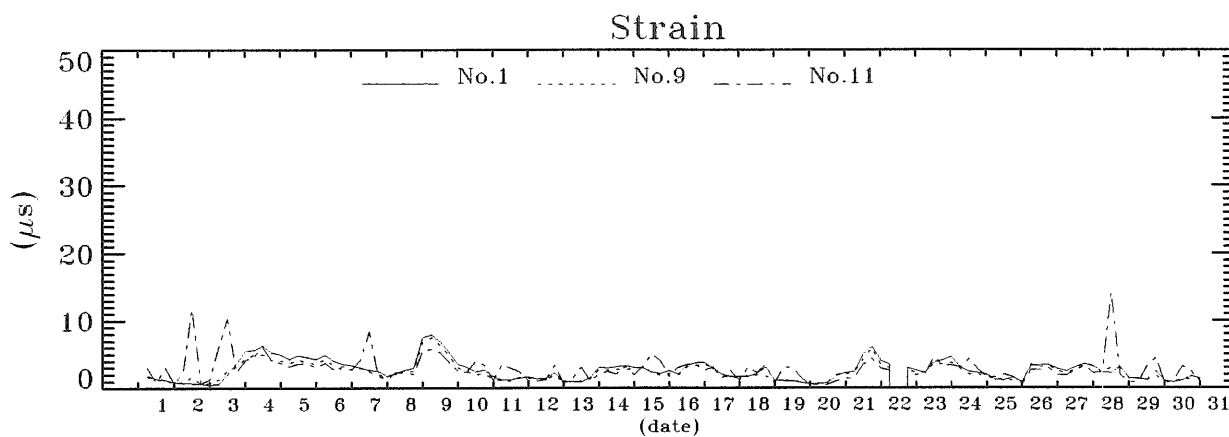
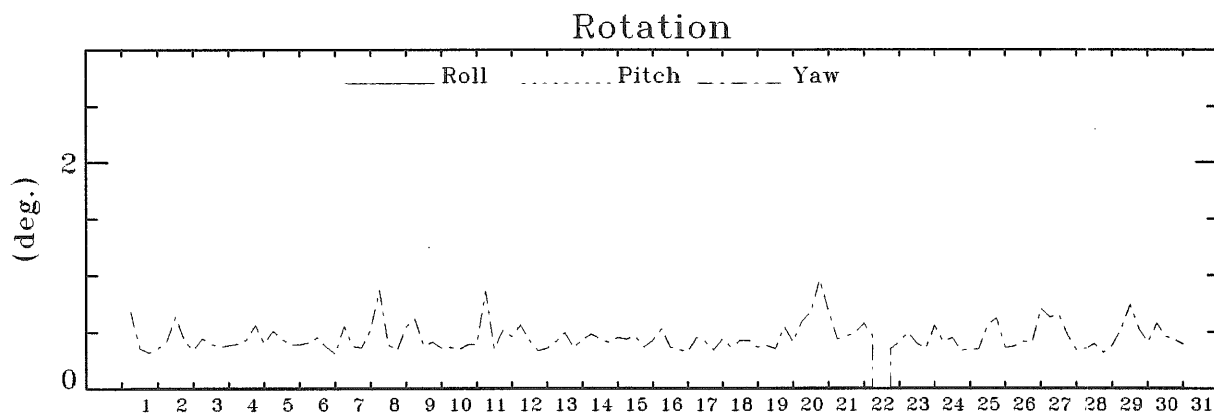
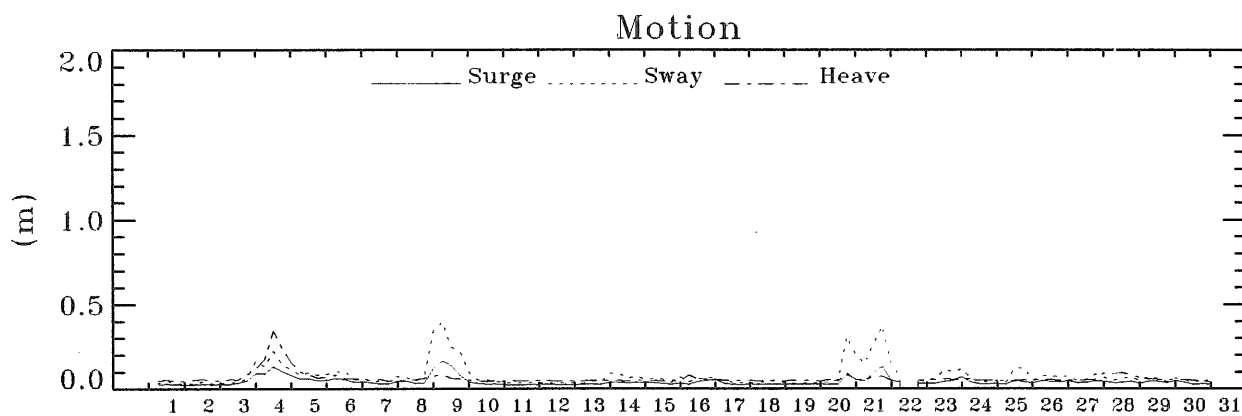
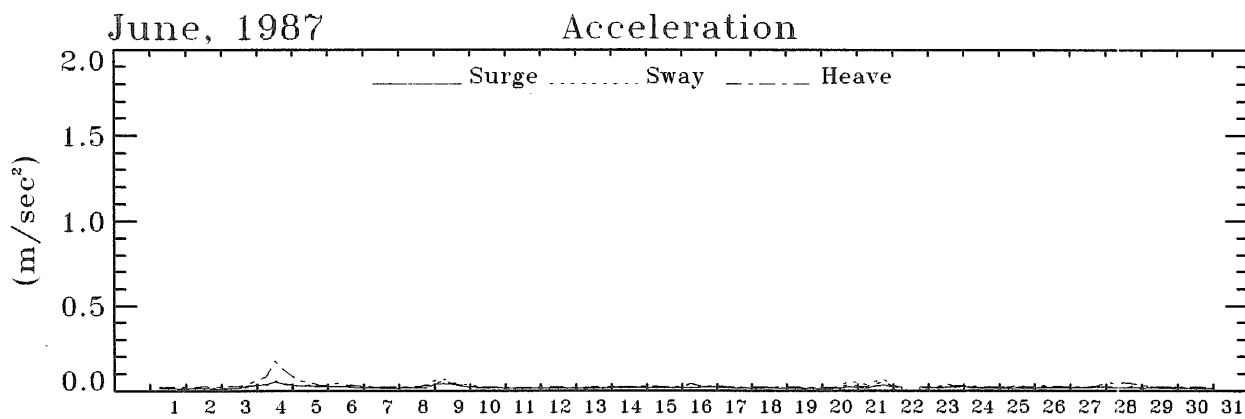


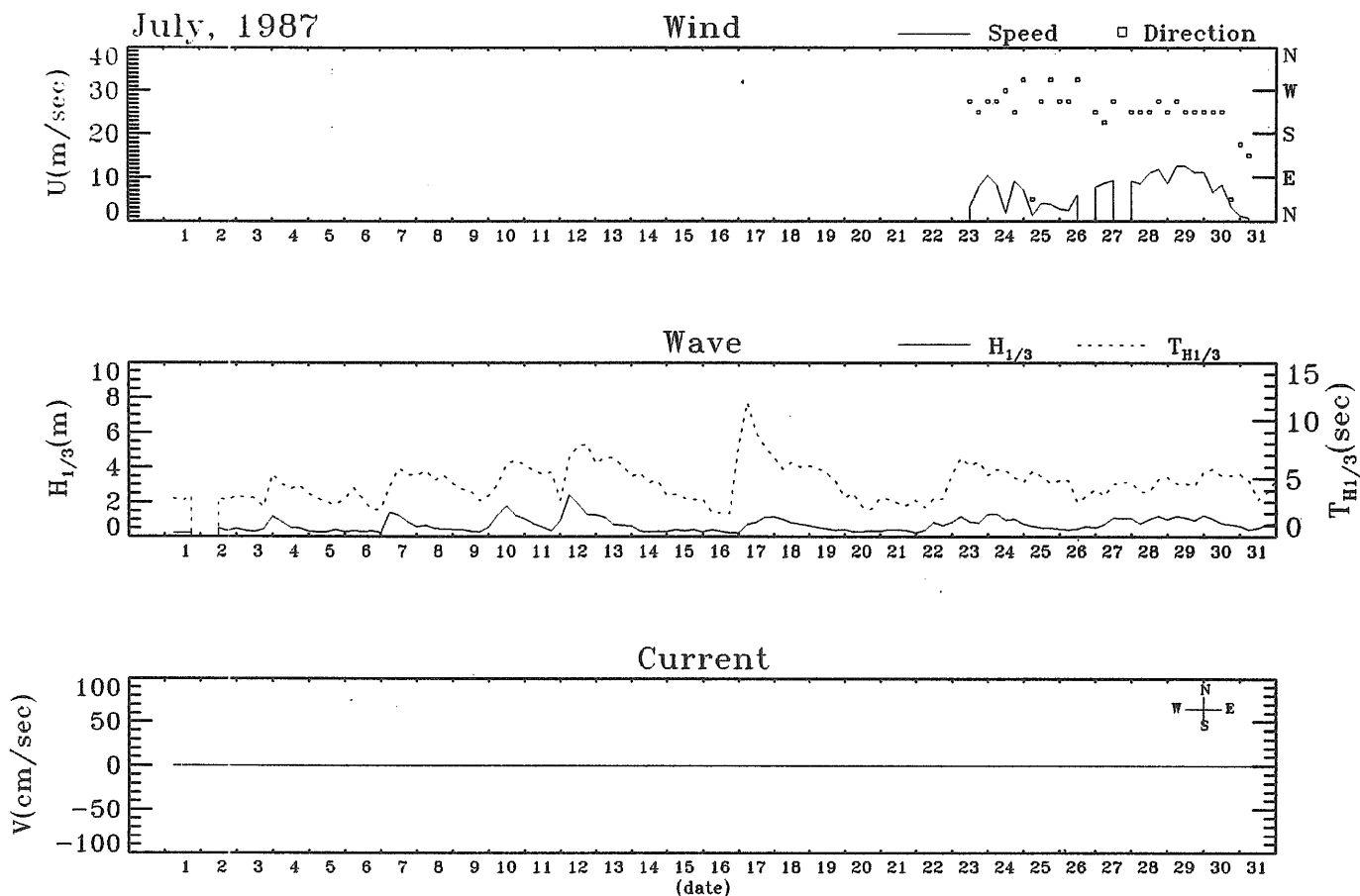


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 *** 月の統計量 <<< 1987 年 6 月 >>> ***
 I T E M : Mean Maximum Std.Dev. 測得率(%)
 =====

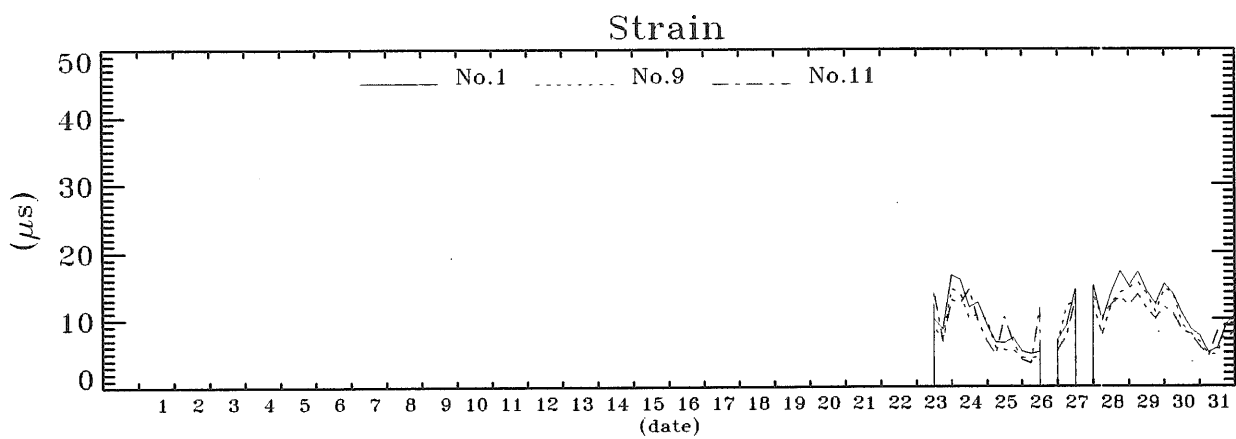
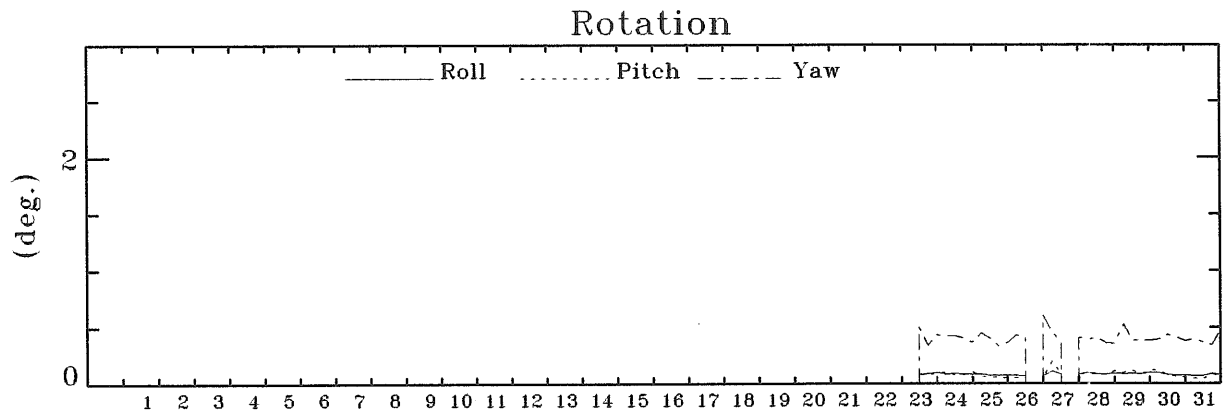
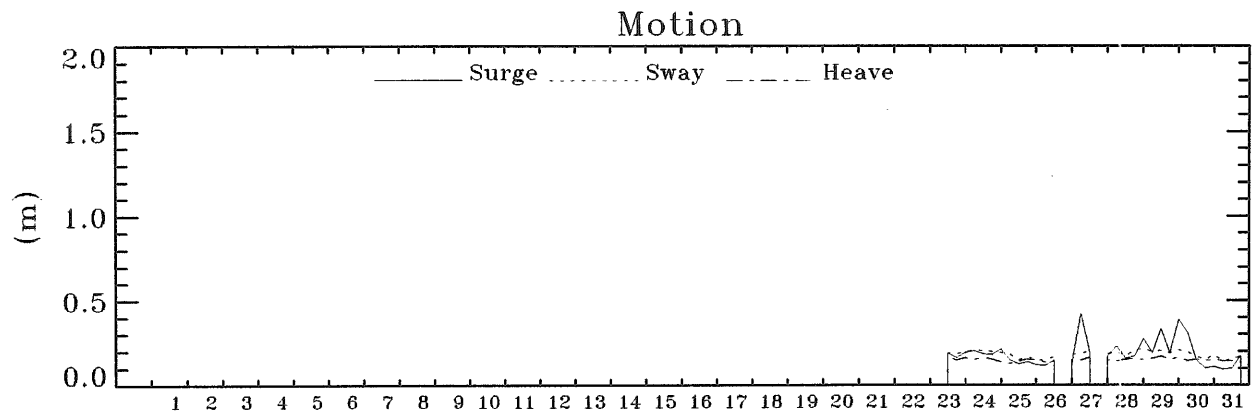
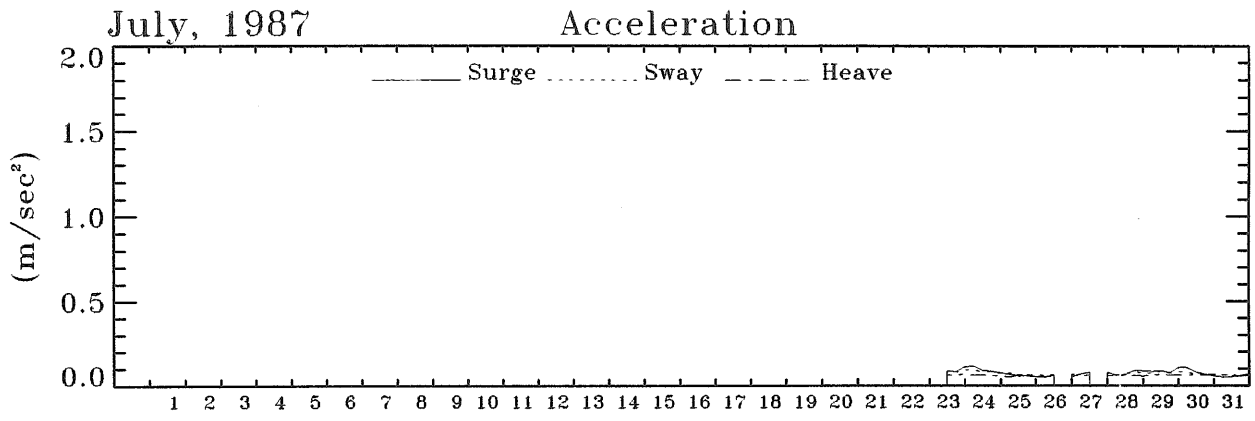
| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
|------------------------------|--------|---------|----------|--------|
| Wind Speed (mean) | 3.4069 | 13.0300 | 2.5933 | 99.17 |
| Wave Hight($H_{1/3}$) | .4837 | 1.5600 | .2813 | 100.00 |
| Wave Period($T_{H_{1/3}}$) | 4.1400 | 8.1300 | 1.1989 | 100.00 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0170 | .0513 | .0072 | 99.17 |
| Sway Acc.(Std.Dev.) | .0230 | .0680 | .0113 | 99.17 |
| Heave Acc.(Std.Dev.) | .0293 | .1747 | .0199 | 99.17 |
| Surge Motion(Std.Dev.) | .0415 | .1640 | .0255 | 99.17 |
| Sway Motion(Std.Dev.) | .0780 | .3976 | .0684 | 99.17 |
| Heave Motion(Std.Dev.) | .0619 | .3441 | .0364 | 99.17 |
| Roll Motion(Std.Dev.) | .0053 | .0055 | .0001 | 99.17 |
| Pitch Motion(Std.Dev.) | .0120 | .0123 | .0001 | 99.17 |
| Yaw Motion(Std.Dev.) | .4530 | .9619 | .1185 | 99.17 |
| Strain No. 1(Std.Dev.) | 2.6002 | 7.8350 | 1.5331 | 99.17 |
| Strain No. 9(Std.Dev.) | 2.4000 | 7.4870 | 1.3133 | 99.17 |
| Strain No.11(Std.Dev.) | 2.8795 | 14.1800 | 2.0224 | 99.17 |

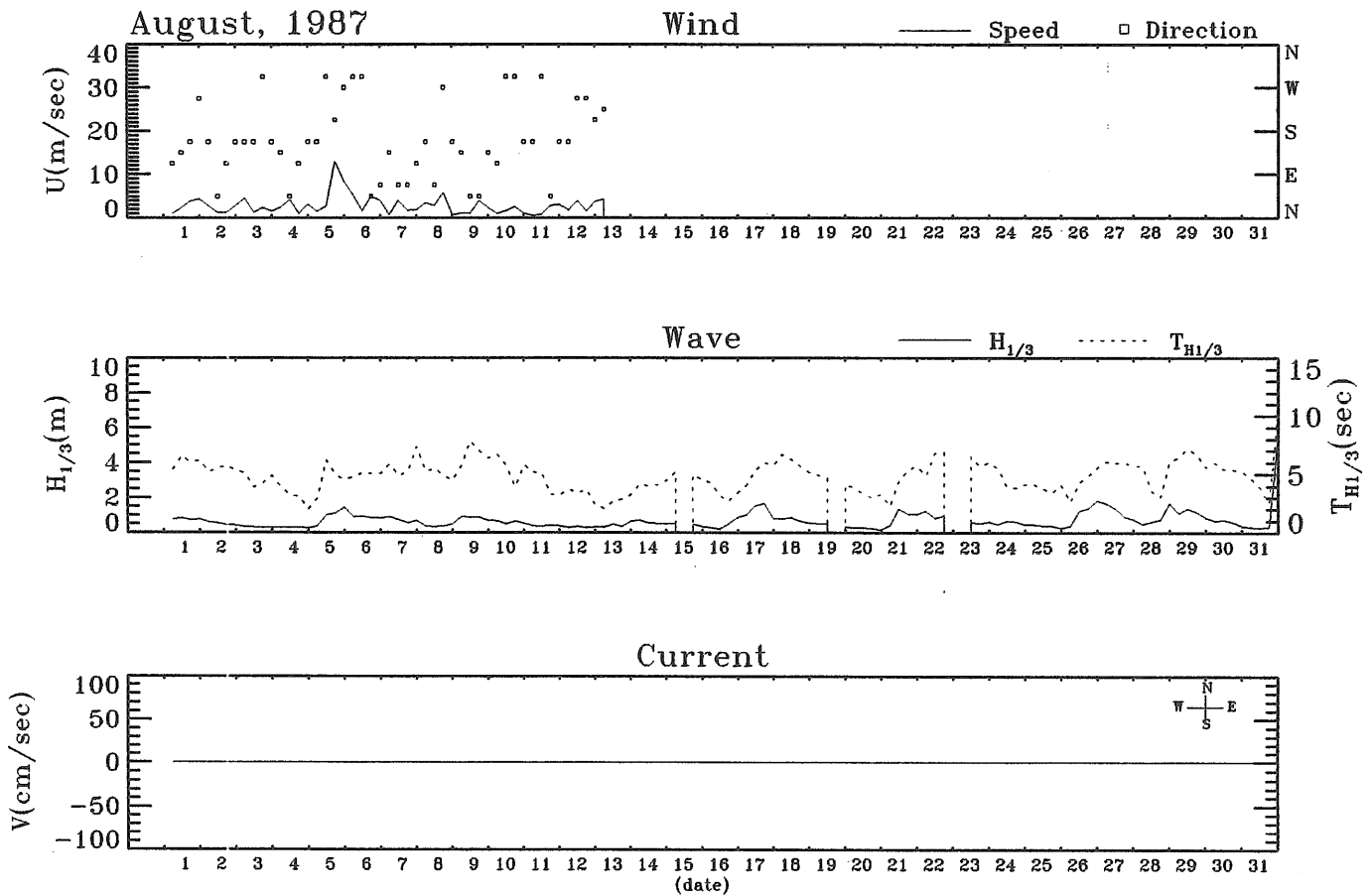
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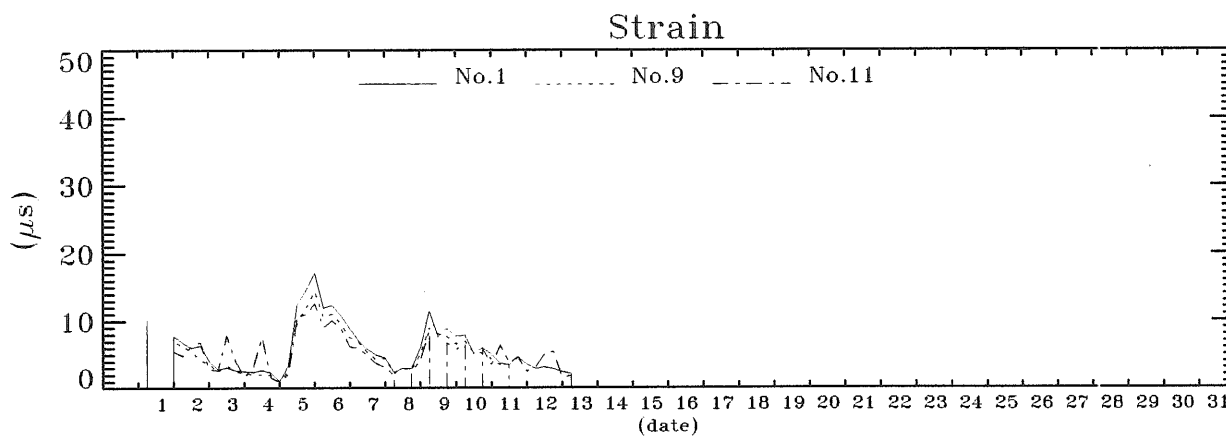
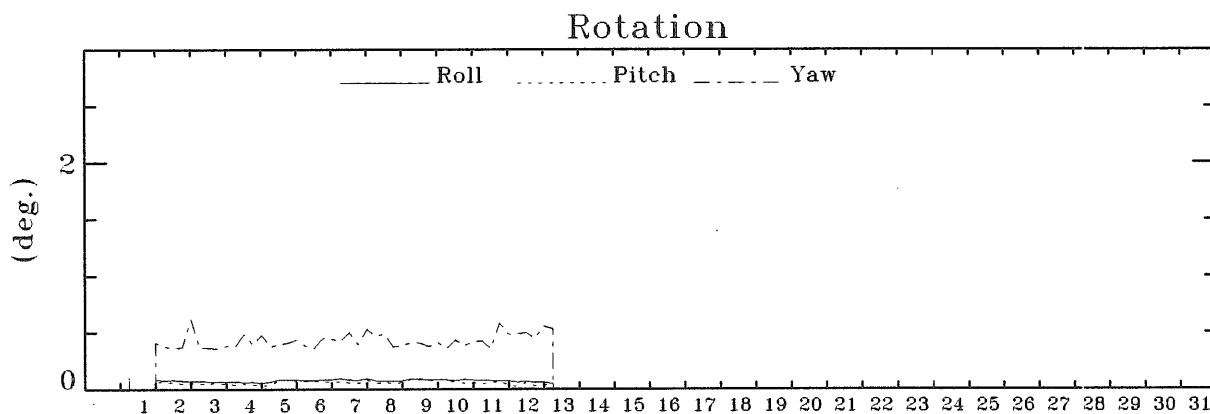
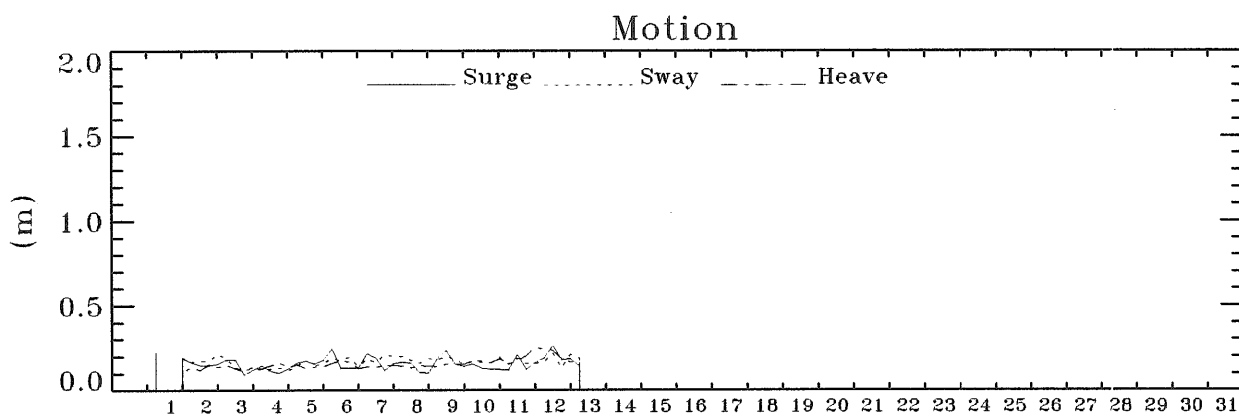
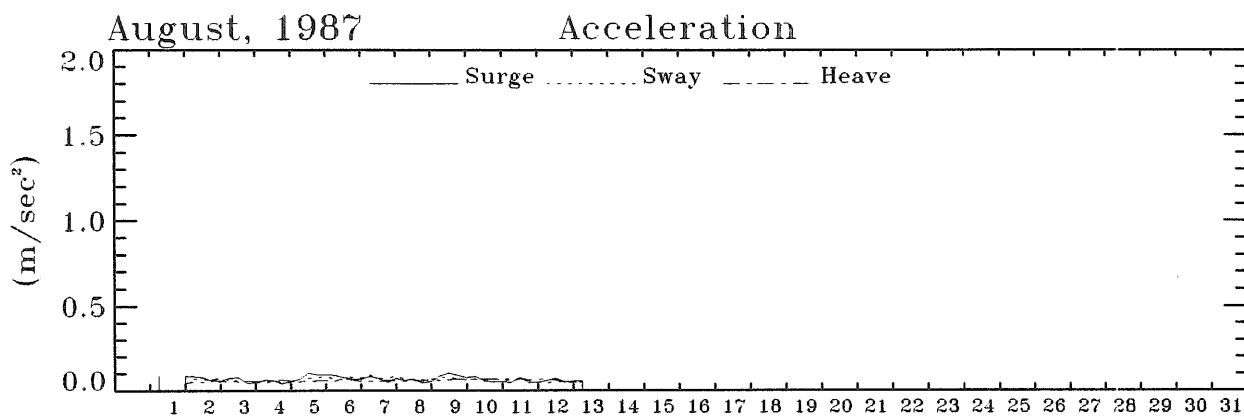


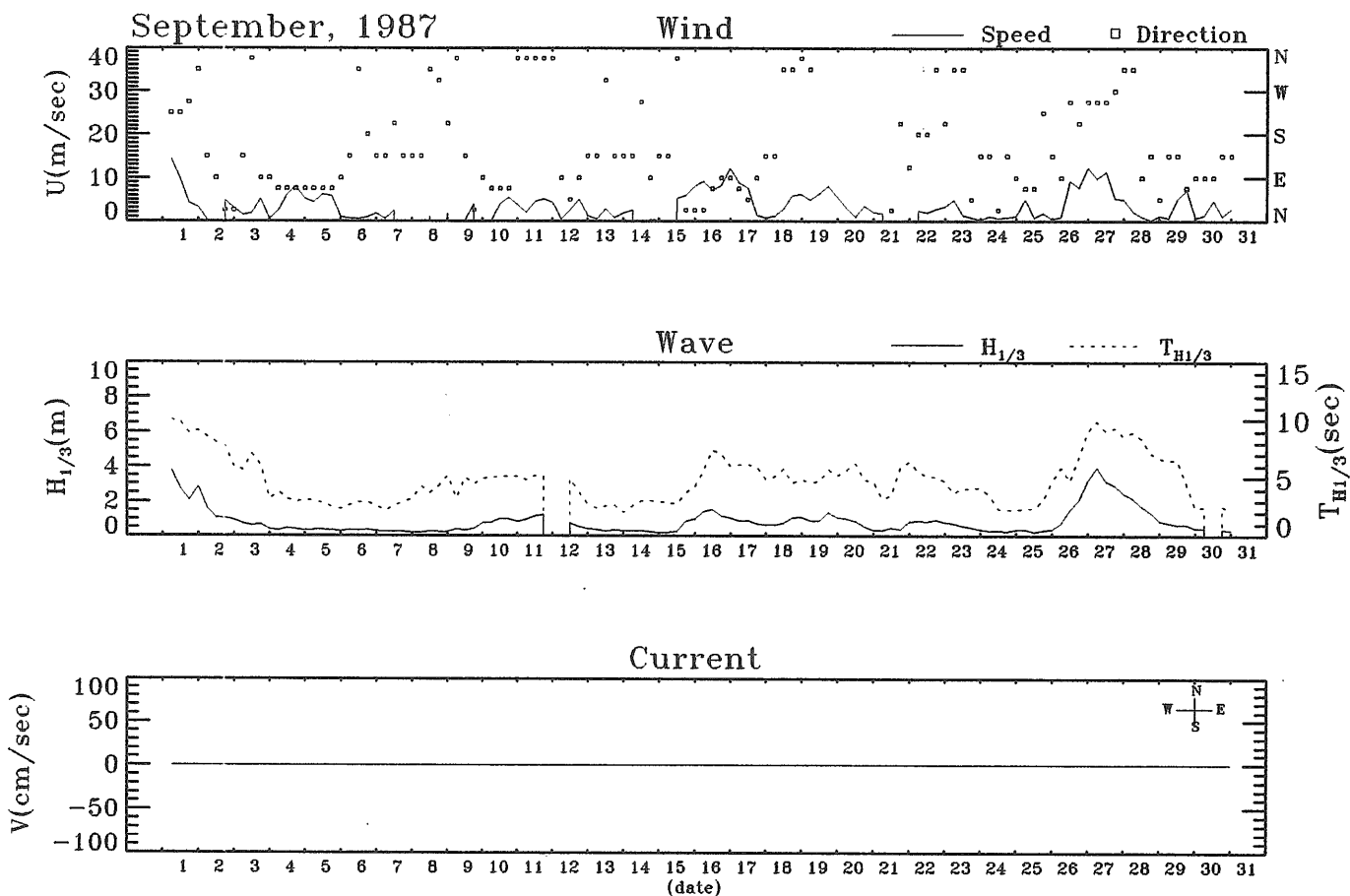
| *** 月の統計量 <<< 1987 年 7 月 >>> *** | | | | |
|----------------------------------|---------|---------|----------|--------|
| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
| Wind Speed (mean) | 6.9727 | 12.5100 | 3.5975 | 24.19 |
| Wave Hight($H_{1/3}$) | .6532 | 2.3900 | .3937 | 98.39 |
| Wave Period($T_H_{1/3}$) | 4.6496 | 11.5700 | 1.5570 | 98.39 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0732 | .1145 | .0179 | 26.61 |
| Sway Acc.(Std.Dev.) | .0724 | .0919 | .0090 | 26.61 |
| Heave Acc.(Std.Dev.) | .0609 | .0662 | .0035 | 26.61 |
| Surge Motion(Std.Dev.) | .1855 | .4184 | .0784 | 25.81 |
| Sway Motion(Std.Dev.) | .1816 | .2153 | .0205 | 25.81 |
| Heave Motion(Std.Dev.) | .1500 | .1690 | .0091 | 25.81 |
| Roll Motion(Std.Dev.) | .0783 | .1037 | .0101 | 26.61 |
| Pitch Motion(Std.Dev.) | .0790 | .1941 | .0297 | 26.61 |
| Yaw Motion(Std.Dev.) | .4070 | .6023 | .0558 | 26.61 |
| Strain No. 1(Std.Dev.) | 10.5892 | 17.1100 | 3.8874 | 26.61 |
| Strain No. 9(Std.Dev.) | 9.7069 | 15.4800 | 3.6391 | 26.61 |
| Strain No.11(Std.Dev.) | 9.3420 | 14.4700 | 3.2010 | 26.61 |





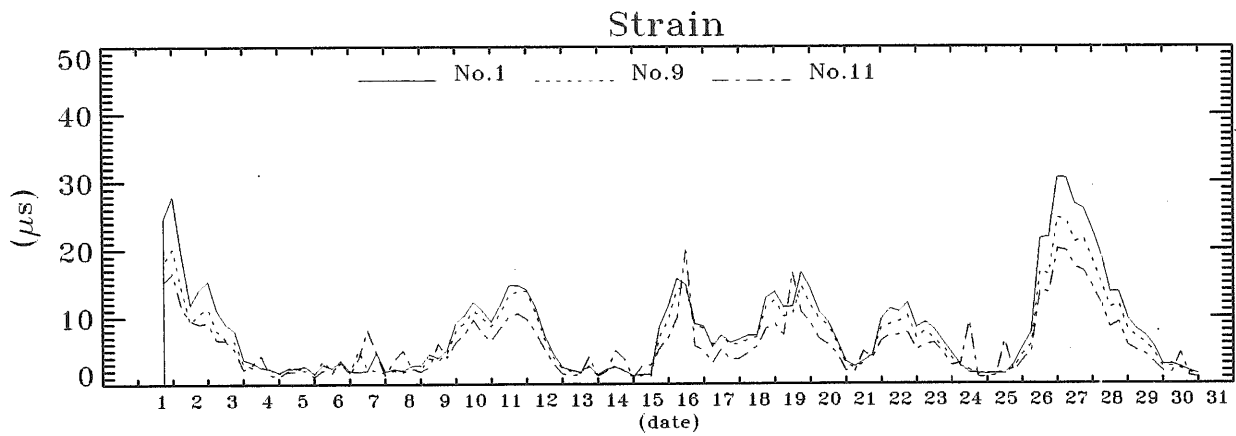
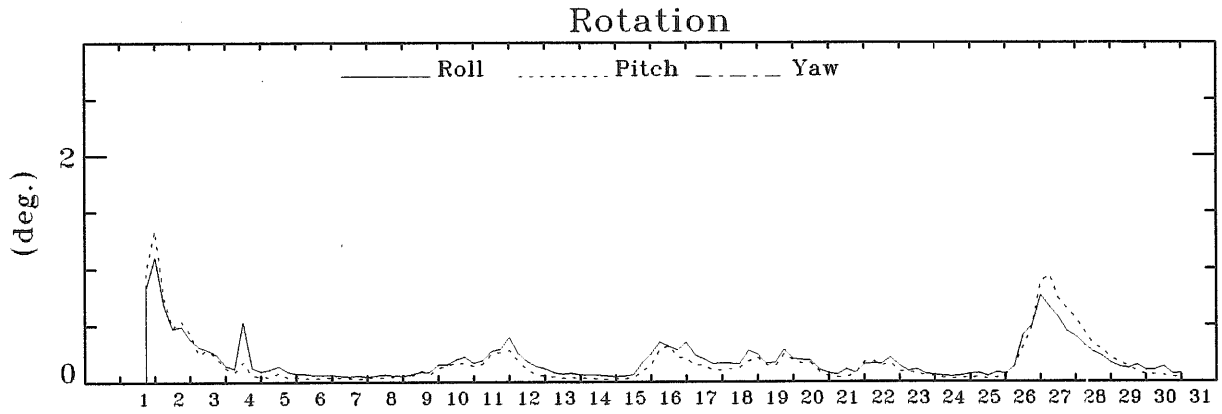
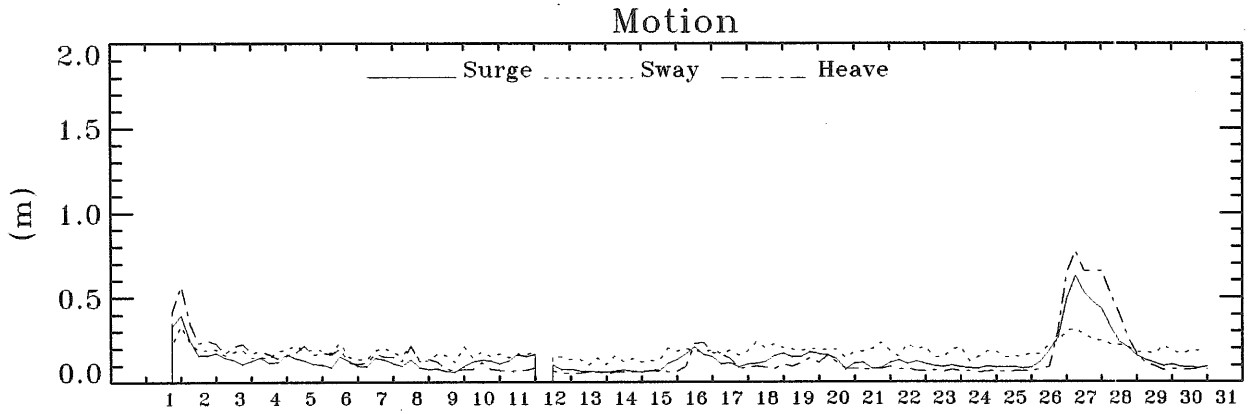
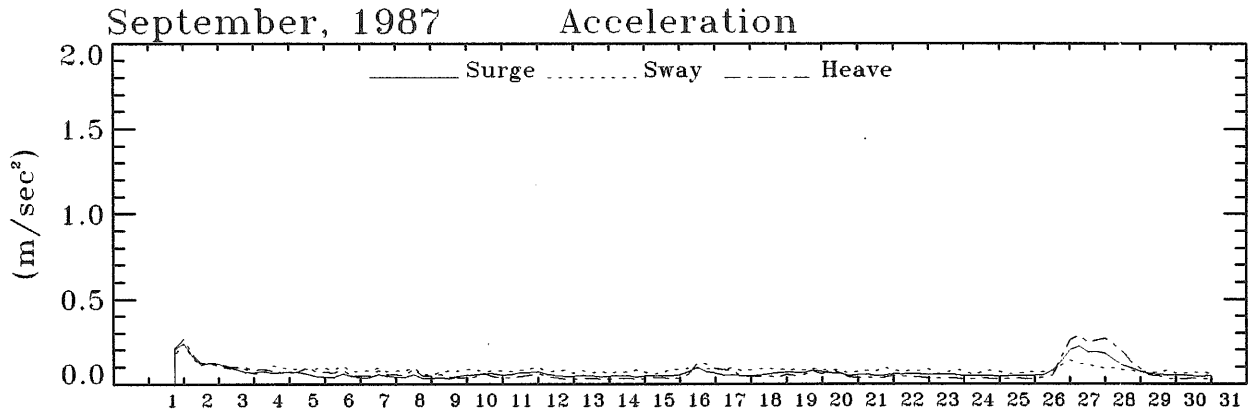
| *** 月の統計量 <<< 1987 年 8 月 >>> *** | | | | |
|----------------------------------|--------|---------|----------|--------|
| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
| Wind Speed (mean) | 3.1356 | 16.6800 | 2.8756 | 40.32 |
| Wave Hight($H_{1/3}$) | .6826 | 5.4600 | .5686 | 96.77 |
| Wave Period($T_{H_{1/3}}$) | 4.8487 | 10.1200 | 1.3554 | 96.77 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0742 | .4712 | .0602 | 38.71 |
| Sway Acc.(Std.Dev.) | .0692 | .2938 | .0346 | 38.71 |
| Heave Acc.(Std.Dev.) | .0614 | .1366 | .0130 | 38.71 |
| Surge Motion(Std.Dev.) | .1812 | 1.3030 | .1680 | 38.71 |
| Sway Motion(Std.Dev.) | .1790 | .5904 | .0654 | 38.71 |
| Heave Motion(Std.Dev.) | .1624 | .4666 | .0531 | 38.71 |
| Roll Motion(Std.Dev.) | .0739 | .1501 | .0150 | 38.71 |
| Pitch Motion(Std.Dev.) | .0633 | .2782 | .0358 | 38.71 |
| Yaw Motion(Std.Dev.) | .4271 | .6160 | .0636 | 37.10 |
| Strain No. 1(Std.Dev.) | 6.4399 | 33.9100 | 5.4139 | 38.71 |
| Strain No. 9(Std.Dev.) | 6.3419 | 33.6000 | 5.3435 | 33.06 |
| Strain No.11(Std.Dev.) | 5.6810 | 24.4300 | 3.9626 | 36.29 |

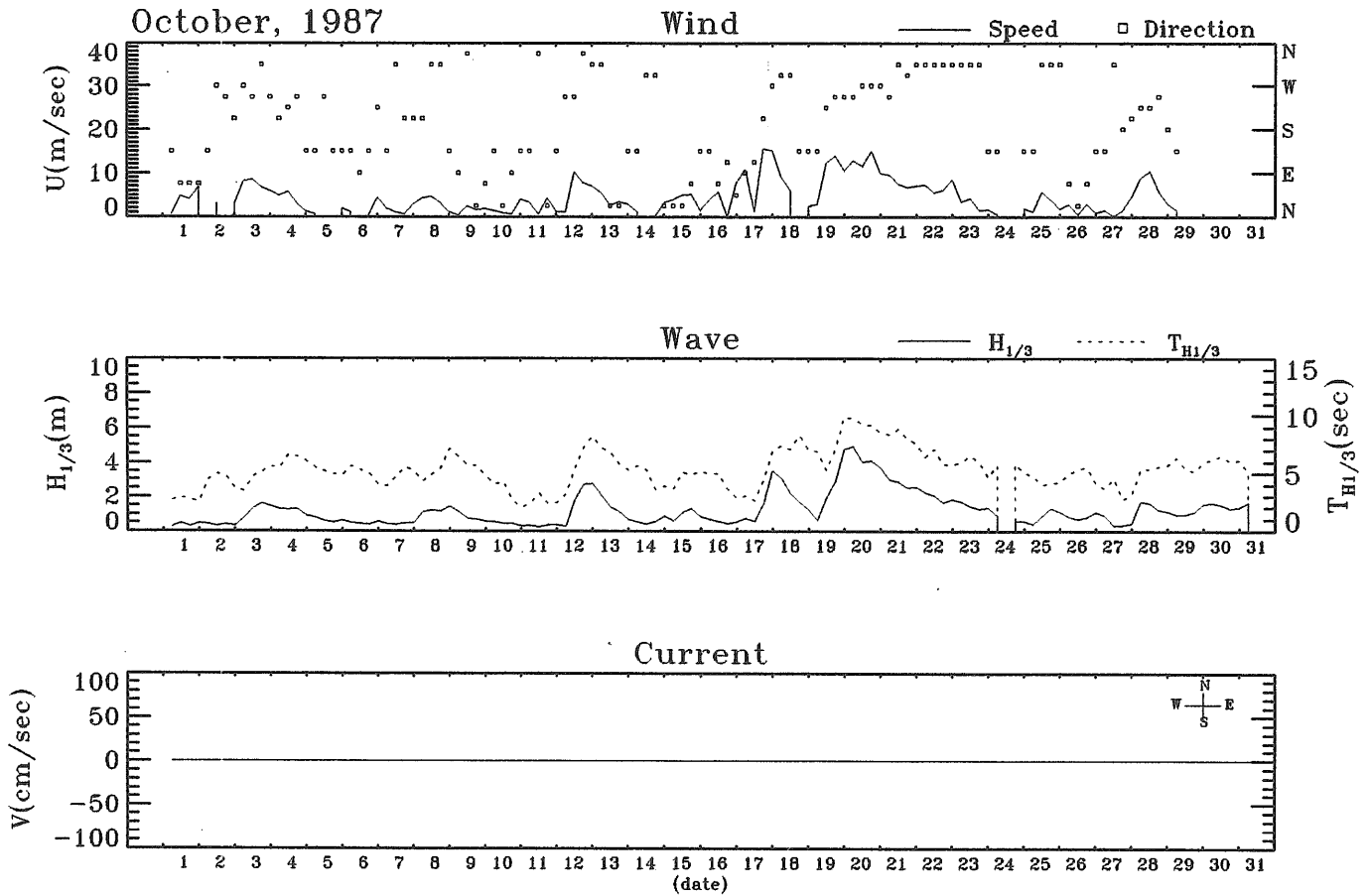




*** 月の統計量 <<< 1987 年 9 月 >>> ***

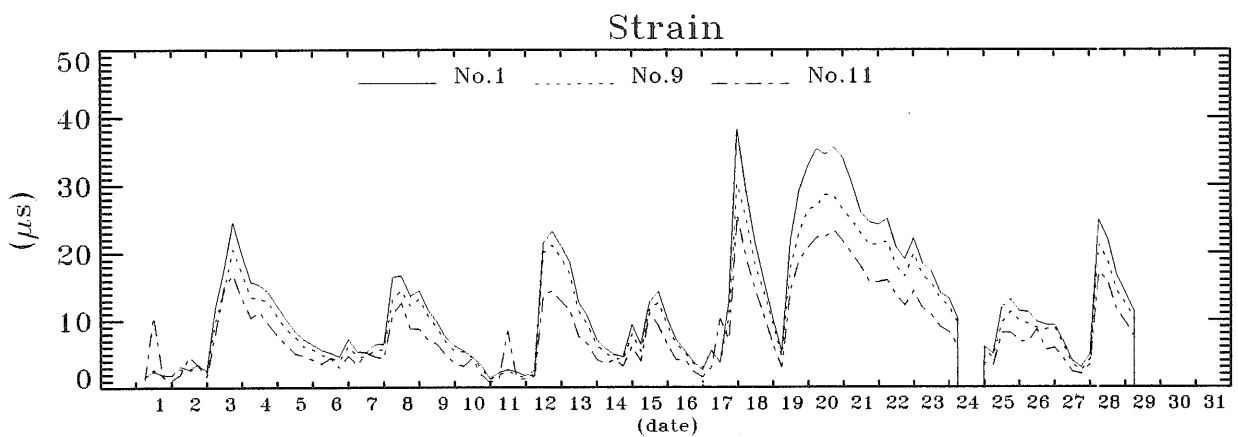
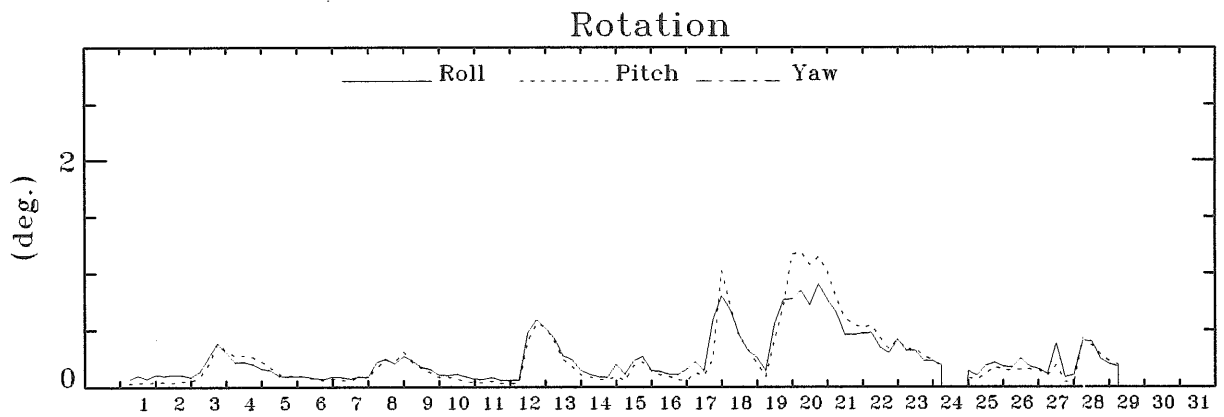
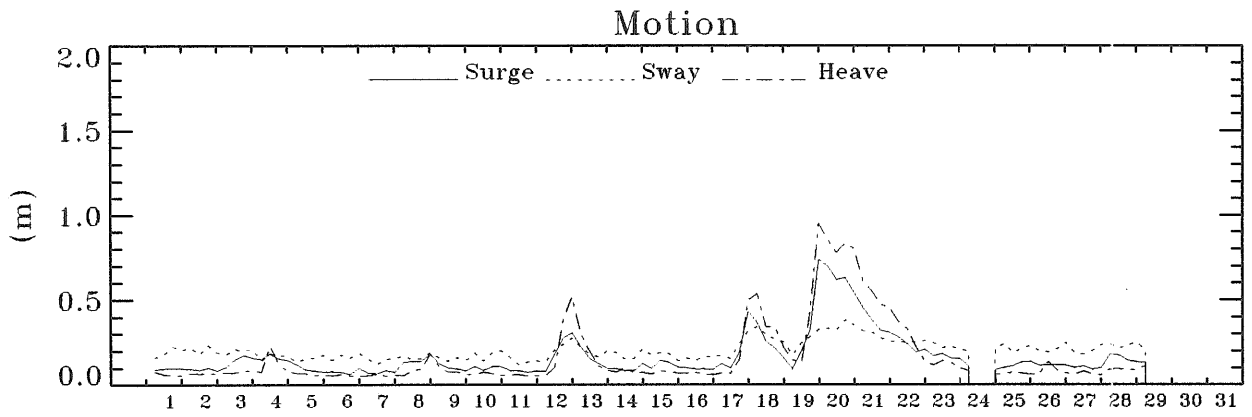
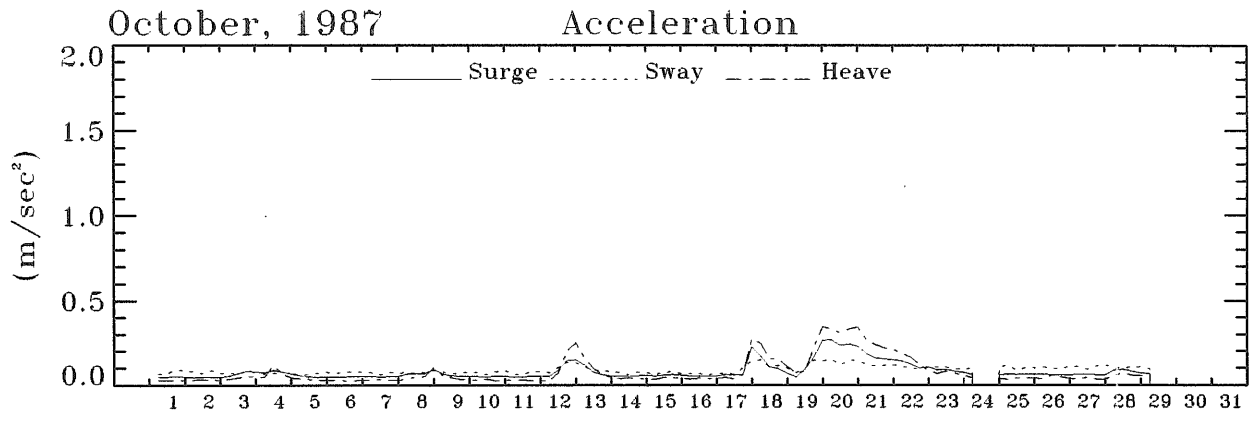
| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
|------------------------------|--------|---------|----------|--------|
| Wind Speed (mean) | 3.2182 | 14.3500 | 3.2365 | 100.00 |
| Wave Hight($H_{1/3}$) | .8184 | 3.9300 | .7595 | 97.50 |
| Wave Period($T_{H_{1/3}}$) | 4.8368 | 10.0200 | 2.0493 | 97.50 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .0667 | .2370 | .0403 | 98.33 |
| Sway Acc.(Std.Dev.) | .0839 | .2396 | .0234 | 98.33 |
| Heave Acc.(Std.Dev.) | .0700 | .2843 | .0583 | 98.33 |
| Surge Motion(Std.Dev.) | .1392 | .6247 | .0959 | 97.50 |
| Sway Motion(Std.Dev.) | .1817 | .3359 | .0397 | 97.50 |
| Heave Motion(Std.Dev.) | .1505 | .7716 | .1428 | 97.50 |
| Roll Motion(Std.Dev.) | .1896 | 1.1020 | .1788 | 98.33 |
| Pitch Motion(Std.Dev.) | .1744 | 1.3410 | .2204 | 98.33 |
| Yaw Motion(Std.Dev.) | --- | --- | --- | .00 |
| Strain No. 1(Std.Dev.) | 8.1356 | 30.5300 | 6.8883 | 98.33 |
| Strain No. 9(Std.Dev.) | 6.9931 | 24.6800 | 5.4609 | 98.33 |
| Strain No.11(Std.Dev.) | 5.9998 | 20.0700 | 4.4647 | 98.33 |

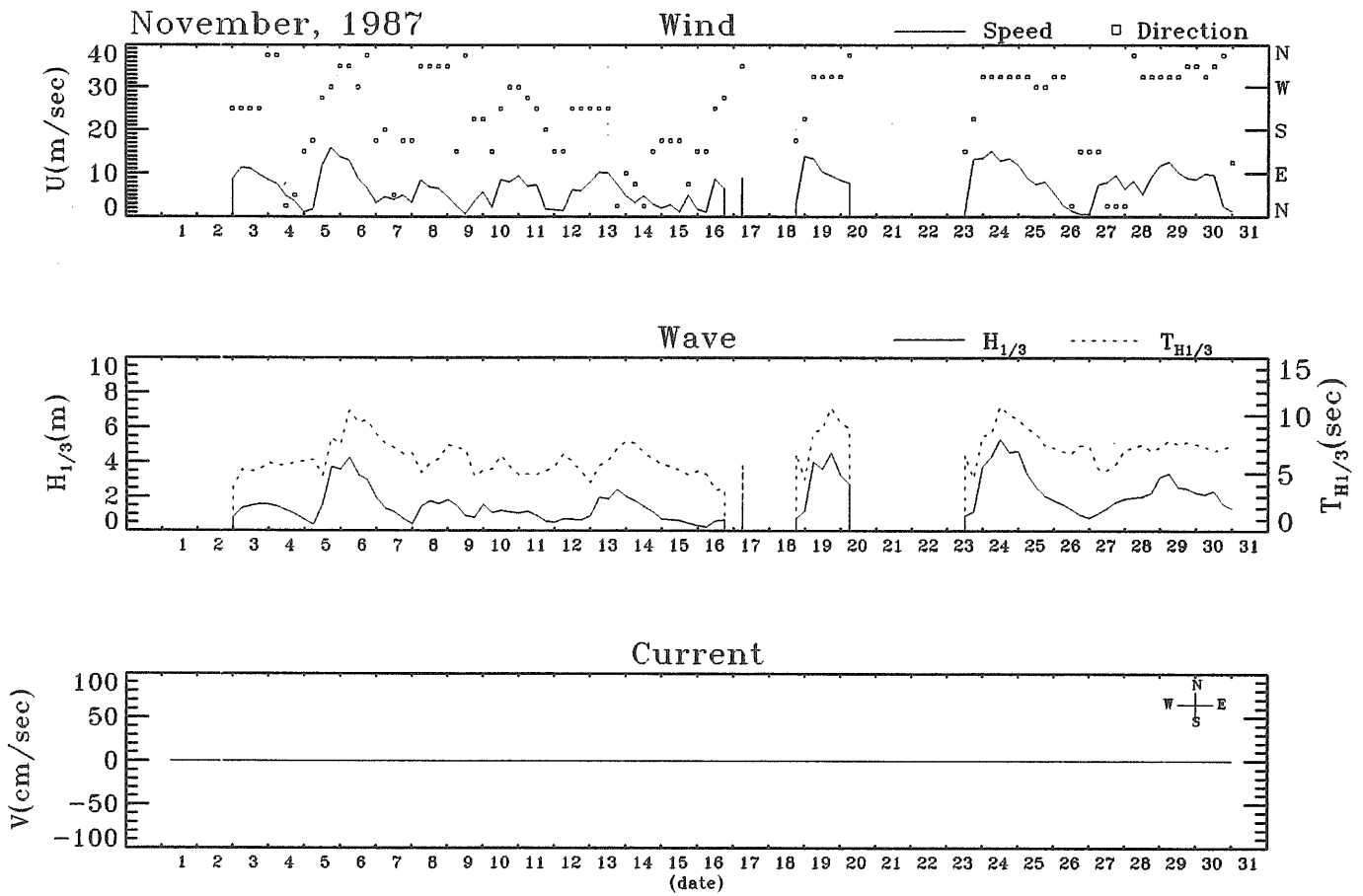




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 *** 月の統計量 <<< 1987 年 10 月 >>> ***
 I T E M : Mean Maximum Std.Dev. 測得率(%)

 Wind Speed (mean) 4.2064 15.5200 3.8049 89.52
 Wave Hight($H_{1/3}$) 1.1957 4.9000 .9602 96.77
 Wave Period($T_{H_{1/3}}$) 5.3544 9.9000 1.6665 96.77
 Current Speed (mean) --- --- --- .00
 (every hour) --- --- --- .00
 Surge Acc.(Std.Dev.) .0789 .2636 .0491 89.52
 Sway Acc.(Std.Dev.) .0891 .1513 .0227 89.52
 Heave Acc.(Std.Dev.) .0790 .3441 .0805 89.52
 Surge Motion(Std.Dev.) .1644 .7364 .1303 89.52
 Sway Motion(Std.Dev.) .2057 .3809 .0545 89.52
 Heave Motion(Std.Dev.) .1640 .9495 .1950 89.52
 Roll Motion(Std.Dev.) .2492 .9040 .2014 89.52
 Pitch Motion(Std.Dev.) .2489 1.1930 .2635 89.52
 Yaw Motion(Std.Dev.) --- --- --- .00
 Strain No. 1(Std.Dev.) 12.3960 38.1700 9.0668 89.52
 Strain No. 9(Std.Dev.) 10.7568 30.2400 7.4243 89.52
 Strain No.11(Std.Dev.) 8.4442 25.5800 5.8463 89.52
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*** 月の統計量 <<< 1987 年 11 月 >>> ***

| I T E M | Mean | Maximum | Std.Dev. | 測得率(%) |
|------------------------------|---------|---------|----------|--------|
| Wind Speed (mean) | 6.9005 | 15.8800 | 3.9568 | 79.17 |
| Wave Hight($H_{1/3}$) | 1.7566 | 5.2900 | 1.1466 | 79.17 |
| Wave Period($T_{H_{1/3}}$) | 6.6939 | 10.7900 | 1.5795 | 79.17 |
| Current Speed (mean) | --- | --- | --- | .00 |
| (every hour) | --- | --- | --- | .00 |
| Surge Acc.(Std.Dev.) | .1093 | .2975 | .0622 | 79.17 |
| Sway Acc.(Std.Dev.) | .1184 | .2334 | .0274 | 79.17 |
| Heave Acc.(Std.Dev.) | .1282 | .3691 | .0953 | 79.17 |
| Surge Motion(Std.Dev.) | .2378 | .8938 | .1676 | 79.17 |
| Sway Motion(Std.Dev.) | .2509 | .5320 | .0693 | 79.17 |
| Heave Motion(Std.Dev.) | .2775 | 1.0870 | .2485 | 79.17 |
| Roll Motion(Std.Dev.) | .3844 | .8540 | .2088 | 79.17 |
| Pitch Motion(Std.Dev.) | .4192 | 1.8090 | .3497 | 79.17 |
| Yaw Motion(Std.Dev.) | .4158 | .8364 | .1409 | 79.17 |
| Strain No. 1(Std.Dev.) | 18.1887 | 39.3300 | 9.3047 | 79.17 |
| Strain No. 9(Std.Dev.) | 15.8226 | 32.5300 | 7.7322 | 79.17 |
| Strain No.11(Std.Dev.) | 11.8033 | 24.8900 | 6.0281 | 79.17 |