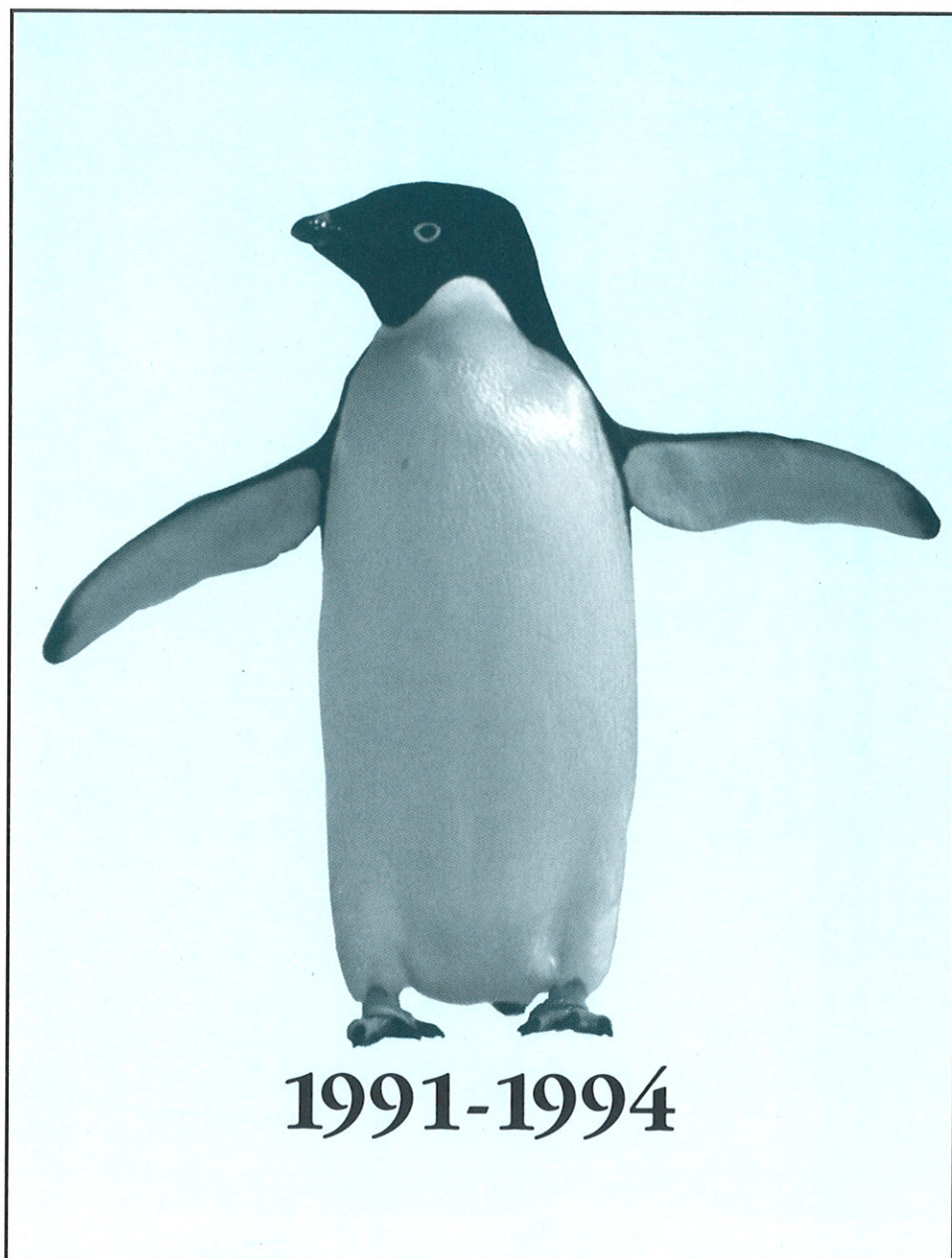


THE AURORA *Programme*

**METEOROLOGICAL DATA FROM THE AURORA PROGRAMME
1993**

INGER HANSSEN-BAUER

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METEOROLOGICAL DATA FROM THE AURORA PROGRAMME 1993

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SUMMARY

The present data report contains time series from 1993 of meteorological elements measured at "Snowhenge", "Bluefields", "Theron Mountains" and "Troll" in Antarctica.

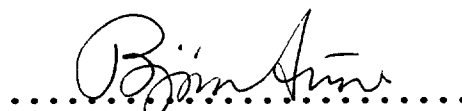
Some preliminary statistics are presented. The annual mean air temperatures were -28.8°C , -16.8°C , -22.0°C and -16.6°C for the 4 stations, respectively. At Snowhenge, which is situated on the Filchner Shelf 80°S , the snow temperature 8.1 m below surface was also measured. Annual mean was -28.4°C . Temperature measurements from Snowhenge and Bluefields are of high quality, while radiation errors frequently affect the temperatures measurements at Theron Mountains and Troll during the summer.

The annual mean wind speed at Bluefields, which is situated quite near the coast, was 7 m/s. This is about twice the value at Snowhenge. At Bluefields, the dominating wind directions were E and NE. At Snowhenge, on the other hand, the wind came from S or SW most of the time.

SIGNATURE



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METEOROLOGICAL DATA FROM THE AURORA PROGRAMME
1993

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1. INTRODUCTION

The present data report covers meteorological data from the Aurora stations Theron Mountains, Bluefields and Snowhenge, and from the Norwegian automatic station at Troll (figure 1) collected during 1993. Data from Theron Mountains and Troll for the period January - June 1993 have been presented earlier (Hanssen-Bauer, 1993b). They are, however, included here in order to enable comparison with data from the other stations.

The data presented in the report are available on ASCII-files. Data from the Aurora stations are free of charge for Aurora programme participants, while others will have to pay handling charges for this information. Further information about the stations and the data handling were given in earlier data reports (Hanssen-Bauer, 1992b and 1993c).

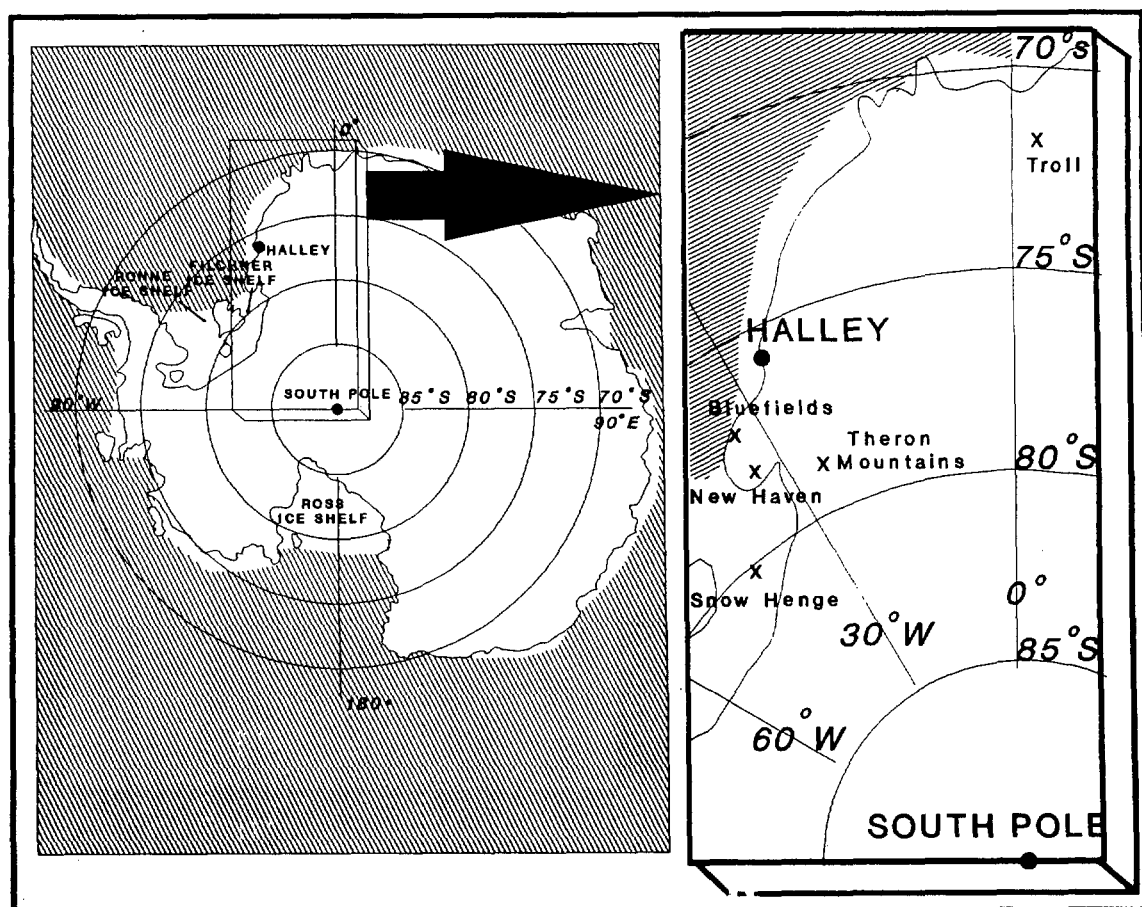


Figure 1. Map of Antarctica (left) and of the station area (right).

2. DATA QUALITY

The quality of the data from the Aanderaa stations (Appendix 1) is generally high. The air temperature sensors are in the range -60°C - $+33^{\circ}\text{C}$, and they are equipped with radiation screens. Both temperature and pressure sensors have been working very well. The wind sensors, however, malfunctioned during cold periods. It was easy to identify periods when the wind vane was frozen, as the logged wind direction was constant during such periods. The constant values were exchanged with missing code prior to further data handling. When the anemometer was frozen, the wind speed was logged as missing.

The quality of the air pressure data from the ICEX capsules (Appendix 2) is reasonable. Occasionally, obviously wrong values were recorded. These were, however, easy to remove. In most cases, it was also easy to find the correct value, as measurements were done frequently, and there were seldom more than two consecutive wrong values.

The quality of the internal temperature measurements of the ICEX capsules is poor. As mentioned earlier (Hanssen-Bauer, 1993a-b) there is probably a considerable radiation error during sunny summer days. The size of this error will depend on local conditions. Comparison of parallel measurements on Snowhenge during January and February 1993, show that temperature series from the Aanderaa station and the ICEX capsule were highly correlated ($R=0.97$). There ICEX temperature was, however, too high most of the time. The difference could be several degrees during warm periods.

3. AVAILABLE DATA 1993

3.1 Bluefields.

The station at Bluefields was an Aandaraa automatic weather station with sensors for air temperature (T_a), air pressure (P), wind speed (F) and direction (D), relative humidity (RH) and global radiation (G). The RH sensor and the G sensor show dubious values and they are not presented here. The other sensors have, however, been working satisfactory. In chapter 4, time series of T_a , P , F and D are presented, as well as the results from some simple statistical analyses.

3.2 Snowhenge.

Because of problems with temperature measurements at Snowhenge during 1992 (Hanssen-Bauer 1992b and 1993a), an Aandaraa automatic weather station was established at January 8 1993 (Pedersen, 1993). Data from this station include air temperature (T_a), snow temperature 8.1 m below surface (T_g), air pressure (P), wind speed (F) and direction (D). The wind speed is missing from mid June to the beginning of October, while the wind direction is missing most of the time from April through September. Except from this, the sensors have been working satisfactory. Results from simple statistical analyses are presented in chapter 4, as well as time series of T_a , P , F and D .

3.3 Theron Mountains.

This station is an Icx Capsule (Appendix 2) measuring internal temperature (T_i) and air pressure (P). T_i was used as substitute for air temperature. Highest and lowest temperature every 12th hour (T_x and T_n) are also available. The station was not visited during the field season 1992-93, but

the temperature measurements do not indicate that the capsule has been buried by snow. However, they clearly indicate the presence of a radiation error in the summer.

Ti and P series are shown in chapter 4. Both were missing during September 8-15, and P was also missing December 24-31.

3.4 Troll.

Air pressure (p) and internal temperature (Ti) of an Icx capsule are available at this station. In January, the capsule was replaced by a new one by the Norwegian Polar Institute. The old capsule was not covered by snow (Jon Ove Hagen pers. comm.). There is, however, probably a radiation error in sunny summer days at this station.

4. PRESENTATION OF DATA FROM 1993

4.1 Monthly means and extreme values.

Table 1a shows monthly and annual mean temperatures for all stations. Troll had the highest mean temperature during the summer months, while Bluefiels was the warmest station during most of the winter, fall and spring. Snowhenge had the lowest mean temperature in all months except November, where Theron Mountains was slightly colder. Note that the snow temperature 8.1 m below the surface at Snowhenge is always close to the annual mean air temperature of the station, which is what one should expect.

Table 1b shows monthly maximum and minimum temperatures at Theron Mountains. For the other stations, extreme temperatures were not logged. However, for all stations, the highest and lowest monthly values of the 3 hourly temperature measurements are given in table 1b.

Table 1a. Monthly and annual mean temperature 1993.

ELEMENT:	A I R T E M P E R A T U R E, C				SNOW TEMP. 8.1M BELOW SURFACE
STATION: MONTH:	BLUE- FIELDS	SNOW- HENGE	THERON MOUNT.	TROLL	SNOWHENGE
JANUARY	-6.7	-10.9	-7.3	-4.2	-29.0
FEBRUARY	-10.8	-20.4	-14.5	-9.8	-28.8
MARS	-14.4	-27.5	-19.8	-16.7	-28.4
APRIL	-18.6	-36.1	-24.6	-20.9	-28.1
MAY	-20.0	-36.1	-25.0	-21.7	-27.8
JUNE	-23.7	-38.1	-29.8	-21.9	-27.7
JULY	-23.0	-42.6	-34.1	-27.4	-27.8
AUGUST	-24.0	-38.3	-29.8	-24.8	-28.1
SEPTEMBER	-24.1	-41.0	-30.8*	-23.2	-28.3
OCTOBER	-18.1	-29.3	-23.0	-15.0	-28.7
NOVEMBER	-10.7	-15.5	-15.8	-8.3	-29.0
DECEMBER	-7.7	-10.0	-9.4	-4.6	-29.2
ANNUAL	-16.8	-28.8	-22.0	-16.6	-28.4

* Temperature at Theron Mountains was missing September 8-15.

Table 1b. Monthly extreme temperatures 1993.

ELEMENT:	HIGHEST 3RD HOUR TEMP., C				MAX T	LOWEST 3RD HOUR TEMP., C				T MIN
STATION: MONTH:	BLUE- FIEL.	SNOW- HENGE	THERON MOUNT.	TROLL	THERON MOUNT.	BLUE- FIEL.	SNOW- HENGE	THERON MOUNT.	TROLL	THERON MOUNT.
JANUARY	0.2	-5.0	6.3R	6.9R	7.8R	-14.1	-22.1	-20.9	-11.4	-22.9
FEBRUARY	-2.5	-9.2	1.6R	1.9R	4.6R	-19.3	-32.8	-31.1	-24.8	-31.1
MARS	-5.4	-9.0	-9.9	-1.8	-9.2	-25.6	-43.8	-33.9	-28.6	-35.7
APRIL	-11.2	-19.5	-13.7	-8.3	-13.4	-32.4	-47.4	-39.9	-31.1	-42.4
MAY	-7.4	-7.2	-13.4	-8.7	-13.1	-37.7	-51.7	-37.2	-37.7	-39.2
JUNE	-10.9	-21.5	-13.0	-7.6	-12.7	-33.8	-53.4	-42.8	-35.3	-43.1
JULY	-11.5	-34.1	-22.4	-11.1	-21.9	-35.8	-53.5	-44.4	-39.3	-45.9
AUGUST	-9.3	-18.7	-15.2	-14.9	-15.2	-40.2	-60.3	-45.4	-35.6	-46.9
SEPTEMB.	-11.5	-17.9	-13.1*	-9.5	-13.1*	-37.6	-53.8	-42.5*	-36.4	-44.1*
OCTOBER	-8.4	-8.0	-13.4	-4.8	-13.1	-33.5	-46.6	-33.3	-28.0	-35.3
NOVEMBER	-2.0	-3.1	-10.4	5.1	-10.2	-22.5	-34.1	-27.3	-24.8	-29.7
DECEMBER	-0.9	-4.8	5.7R	6.2R	5.7R	-12.9	-16.8	-13.2	-14.8	-15.4

*: Temperature at Theron Mountains was missing September 8-15.
R: These temperatures are due to radiation error

The highest temperatures observed at Theron Mountains and Troll in January, February and December are not representative for the air temperature, as they are due to radiation error.

Monthly and annual averages of air pressure and wind speed are presented in table 2. The most frequent wind direction for each month and for the year is also presented in this table.

Table 2. Monthly mean values 1993.

ELEMENT:	AIR PRESSURE, MB			WIND SPEED, M/S		MOST FREQUENT WIND DIRECTION	
STATION: MONTH:	BLUE-FIELDS	THERON MOUNT.	TROLL	BLUE-FIELDS	SNOW-HENGE	BLUEFIELDS	SNOWHENGE
JANUARY	950.8	894.8	846.9	4.9	3.9	E (36%)	S (38%)
FEBRUARY	940.8	884.3	835.8	4.7	4.0	E (40%)	SW(44%)
MARS	937.6	881.8	835.2	6.3	3.9	NE(47%)	SW(40%)
APRIL	937.9	885.4	835.7	6.6	2.0	NE(43%)	SW(58%)***
MAY	933.3	877.2	832.7	8.9	2.1	NE(46%)	SW(36%)***
JUNE	935.0	878.2	832.5	8.3	4.7**	E (45%)	SW(52%)***
JULY	934.5	877.2	834.3	7.4	. **	E (37%)	SW(57%)***
AUGUST	931.5	874.4	834.5	8.6	. **	NE(53%)	SW(48%)***
SEPTEMB.	932.7	875.3*	834.2	7.3	. **	E (51%)	- ***
OCTOBER	929.3	873.3	834.3	8.7	4.2**	NE(50%)	SW(33%)
NOVEMBER	938.1	882.8	844.8	7.1	3.3	NE(60%)	SW(26%)
DECEMBER	938.1	892.0*	843.5	5.2	3.9	NE(41%)	SW(30%)
ANNUAL	936.6	881.4	837.0	7.0	3.6**	NE(38%)	SW(37%)

- * : Air pressure at Theron Mountains was missing September 8-15 and December 24-31.
 ** : Wind speed at Snowhenge was missing June 16.- October 7.
 ***: Wind direction at Snowhenge was missing most of the time from April through September.

4.2 Diurnal temperature variation.

The average diurnal temperature variation for each month, and at the different stations are shown in figure 2. At Snowhenge, the average January amplitude is somewhat below the expected value. The reason for this is that the capsule was buried by snow the first 8 days of the month.

At Theron Mountains, the diurnal temperature amplitudes for January and February are more than twice the similar long term monthly averages at Halley (Hanssen-Bauer, 1992a). This is more than expected, and it is probably the result of the radiation error mentioned earlier. Parts of the monthly averaged diurnal temperature amplitudes at Troll are probably also due to radiation error.

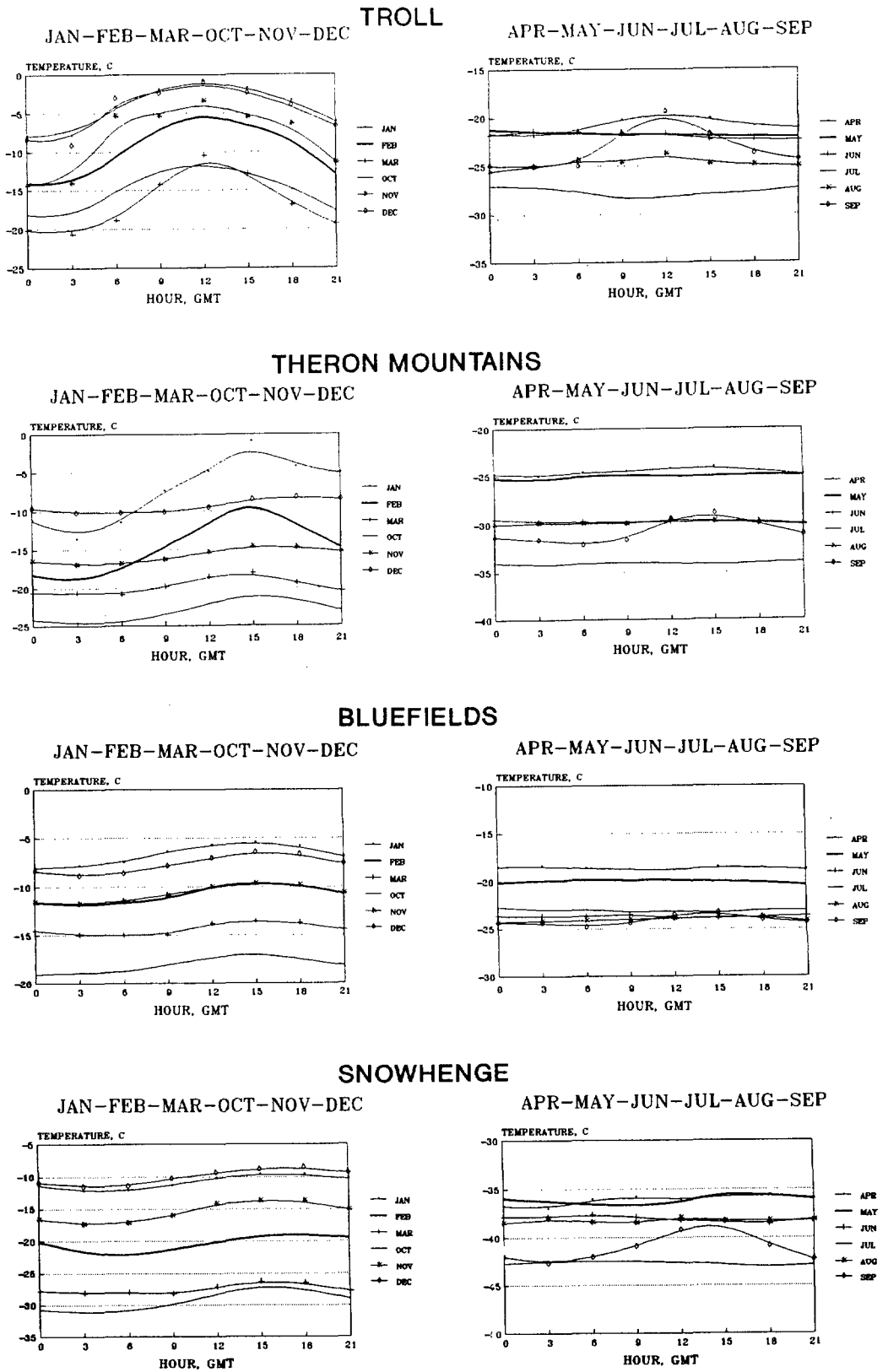


Figure 2. Diurnal temperature variation at each station.

4.3 Correlation analysis - temperature.

Correlation coefficients were computed between the temperature series at the different stations for every month separately, and for the whole year (table 3). To avoid "noise" because of differences in diurnal variation, daily mean temperatures were used in these analyses. On an annual basis, the correlation coefficients between temperatures at Snowhenge, Bluefields and Theron Mountains were about 0.9, while the correlation of these series to the temperature series at Troll were about 0.8. The correlation coefficients for individual months, however, vary considerably. In December, the correlation is not significant at the 5% level for any pair of stations. The reason for this is that the daily mean temperatures were at the same level all month. The differences from one day to another were consequently small compared to local temperature variations.

For most months, the temperature series from Theron Mountains and Bluefields were the best correlated. This is in accordance with earlier results. The reason why their correlation to the Snowhenge series usually was slightly poorer, is probably that the temperature climate at Snowhenge is more affected by the deep flow of cold air flowing from the inlands towards the coast than the other stations.

Table 3. Pearson correlation coefficients between daily mean temperatures at different stations for individual months and for the whole year.

PERIOD	STATION:	SNOWHENGE	BLUEF.	THERON M.	TROLL
JAN	SNOWHENGE	1.00	0.62	0.76	0.04
	BLUEF.	0.62	1.00	0.73	-0.26
	THERON	0.76	0.73	1.00	-0.07
	TROLL	0.04	-0.26	-0.07	1.00
FEB	SNOWHENGE	1.00	0.90	0.89	0.76
	BLUEF.	0.90	1.00	0.88	0.67
	THERON	0.89	0.88	1.00	0.63
	TROLL	0.76	0.67	0.63	1.00
MAR	SNOWHENGE	1.00	0.73	0.71	0.27
	BLUEF.	0.73	1.00	0.82	0.14
	THERON	0.71	0.82	1.00	0.08
	TROLL	0.27	0.14	0.08	1.00
APR	SNOWHENGE	1.00	0.47	0.51	0.51
	BLUEF.	0.47	1.00	0.85	0.59
	THERON	0.51	0.85	1.00	0.71
	TROLL	0.51	0.59	0.71	1.00
MAY	SNOWHENGE	1.00	0.62	0.68	0.40
	BLUEF.	0.62	1.00	0.67	0.16
	THERON	0.68	0.67	1.00	0.48
	TROLL	0.40	0.16	0.48	1.00
JUN	SNOWHENGE	1.00	0.72	0.79	0.31
	BLUEF.	0.72	1.00	0.85	0.49
	THERON	0.79	0.85	1.00	0.44
	TROLL	0.31	0.49	0.44	1.00
JUL	SNOWHENGE	1.00	0.40	0.36	0.30
	BLUEF.	0.40	1.00	0.49	0.50
	THERON	0.36	0.49	1.00	0.34
	TROLL	0.30	0.50	0.34	1.00
AUG	SNOWHENGE	1.00	0.83	0.79	0.32
	BLUEF.	0.83	1.00	0.87	0.17
	THERON	0.79	0.87	1.00	0.21
	TROLL	0.32	0.17	0.21	1.00
SEP	SNOWHENGE	1.00	0.68	0.76*	0.22
	BLUEF.	0.68	1.00	0.82*	0.31
	THERON	0.76*	0.82*	1.00*	0.38*
	TROLL	0.22	0.31	0.38*	1.00
OCT	SNOWHENGE	1.00	0.65	0.82	0.18
	BLUEF.	0.65	1.00	0.88	0.39
	THERON	0.82	0.88	1.00	0.33
	TROLL	0.18	0.39	0.33	1.00
NOV	SNOWHENGE	1.00	0.83	0.91	0.68
	BLUEF.	0.83	1.00	0.89	0.75
	THERON	0.91	0.89	1.00	0.70
	TROLL	0.68	0.75	0.70	1.00
DEC	SNOWHENGE	1.00	-0.30	0.14	-0.12
	BLUEF.	-0.30	1.00	-0.04	-0.06
	THERON	0.14	-0.04	1.00	0.14
	TROLL	-0.12	-0.06	0.14	1.00
YEAR	SNOWHENGE	1.00	0.88	0.91	0.83
	BLUEF.	0.88	1.00	0.92	0.77
	THERON	0.91	0.92	1.00	0.82
	TROLL	0.83	0.77	0.82	1.00

* Temperature was missing at The on Mountains September 8-15.

4.4 Correlation analysis - air pressure.

Table 4 shows that air pressure is very well correlated at Bluefields and Theron Mountains. The correlation coefficients between the pressure at these stations and the pressure at the more distant station Troll are lower. This is in accordance with earlier results.

Table 4. Pearson correlation coefficients between air pressure at different stations.

PERIOD	STATION	BLUEFIELDS	THERON M.	TROLL
JAN	BLUEF.	1.00	0.75	0.63
	THERON M.	0.75	1.00	0.84
	TROLL	0.63	0.84	1.00
FEB	BLUEF.	1.00	0.98	0.87
	THERON	0.98	1.00	0.85
	TROLL	0.87	0.85	1.00
MAR	BLUEF.	1.00	0.96	0.72
	THERON	0.96	1.00	0.79
	TROLL	0.72	0.79	1.00
APR	BLUEF.	1.00	0.96	0.16
	THERON	0.96	1.00	0.26
	TROLL	0.16	0.26	1.00
MAY	BLUEF.	1.00	0.97	0.36
	THERON	0.97	1.00	0.48
	TROLL	0.36	0.48	1.00
JUN	BLUEF.	1.00	0.98	0.68
	THERON	0.98	1.00	0.76
	TROLL	0.68	0.76	1.00
JUL	BLUEF.	1.00	0.97	0.78
	THERON	0.97	1.00	0.76
	TROLL	0.78	0.76	1.00
AUG	BLUEF.	1.00	0.93	0.24
	THERON M.	0.93	1.00	0.36
	TROLL	0.24	0.36	1.00
SEP	BLUEF.	1.00	0.96*	0.72
	THERON	0.96*	1.00*	0.78*
	TROLL	0.72	0.78*	1.00
OCT	BLUEF.	1.00	0.93	0.67
	THERON	0.93	1.00	0.77
	TROLL	0.67	0.77	1.00
NOV	BLUEF.	1.00	0.87	0.11
	THERON	0.87	1.00	0.38
	TROLL	0.11	0.38	1.00
DEC	BLUEF.	1.00	0.97*	0.76
	THERON	0.97*	1.00*	0.74*
	TROLL	0.76	0.74*	1.00
ALL YEAR	BLUEF.	1.00	0.96	0.68
	THERON	0.96	1.00	0.76
	TROLL	0.68	0.76	1.00

* Air pressure was missing at Theron Mountains September 8-15 and December 24-31.

4.4 Time series.

Figures 3 - 14 show time series of temperature from all stations during 1993. Figures 15 - 26 show series of air pressure from the same period. Figures 27 - 50 show wind speed and direction at Snowhenge and Bluefields.

4. FINAL REMARKS

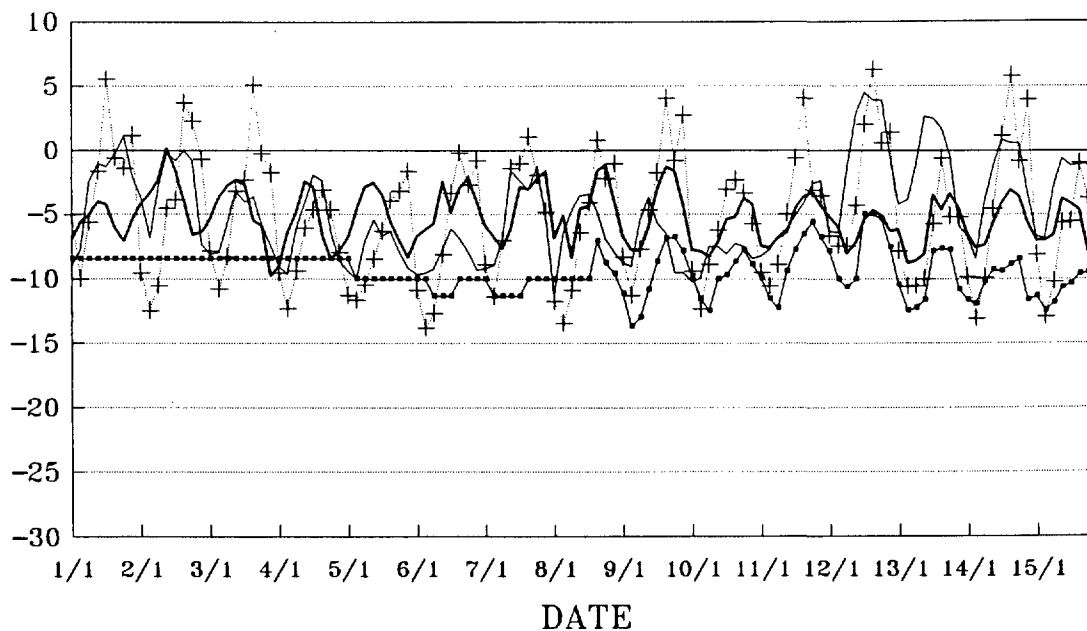
The statistical analyses conducted in the present report should be considered as preliminary. Further analyses of the meteorological data set will be presented in the final meteorological report from the Aurora programme, where the present data set also will be compared to meteorological observations at Halley.

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1.-15. JANUARY 1993

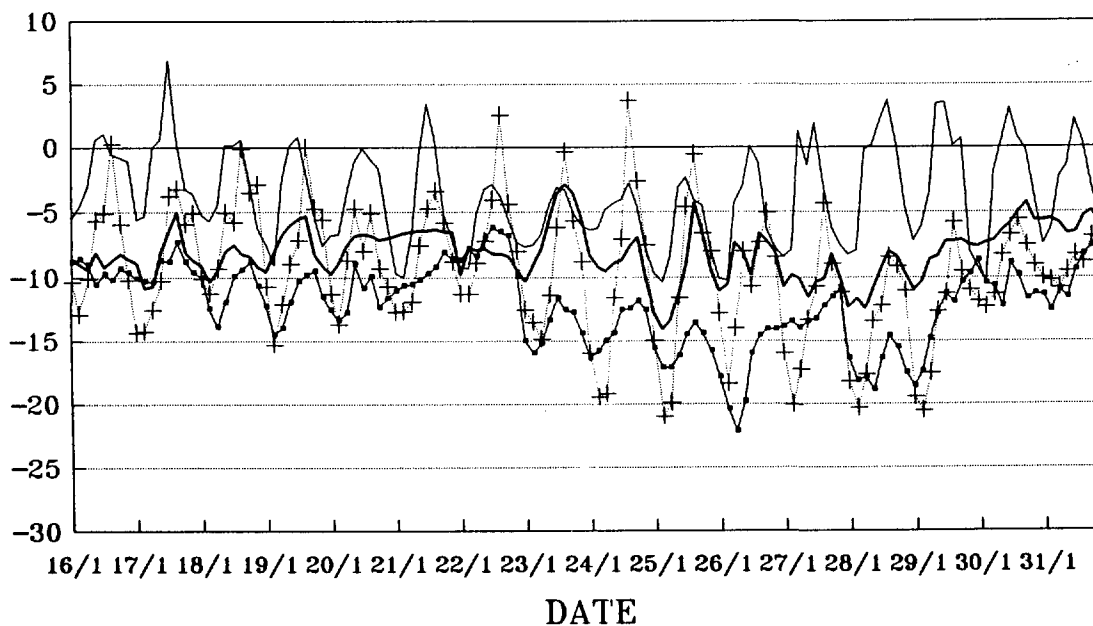
TEMPERATURE, C



—+— Snowhenge — Bluefields + Theron M. - Troll

16.-31. JANUARY 1993

TEMPERATURE, C

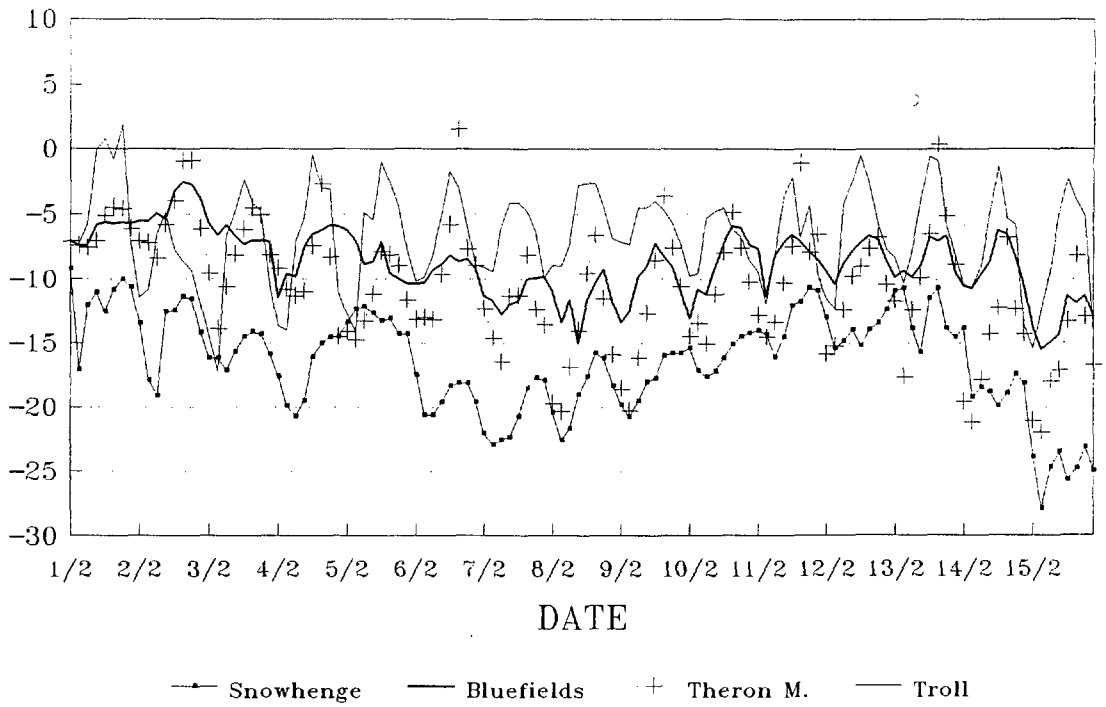


—+— Snowhenge — Bluefields + Theron M. - Troll

Figure 3. Time series of temperature January 1993.

1.-15. FEBRUARY 1993

TEMPERATURE, C



16.-28. FEBRUARY 1993

TEMPERATURE, C

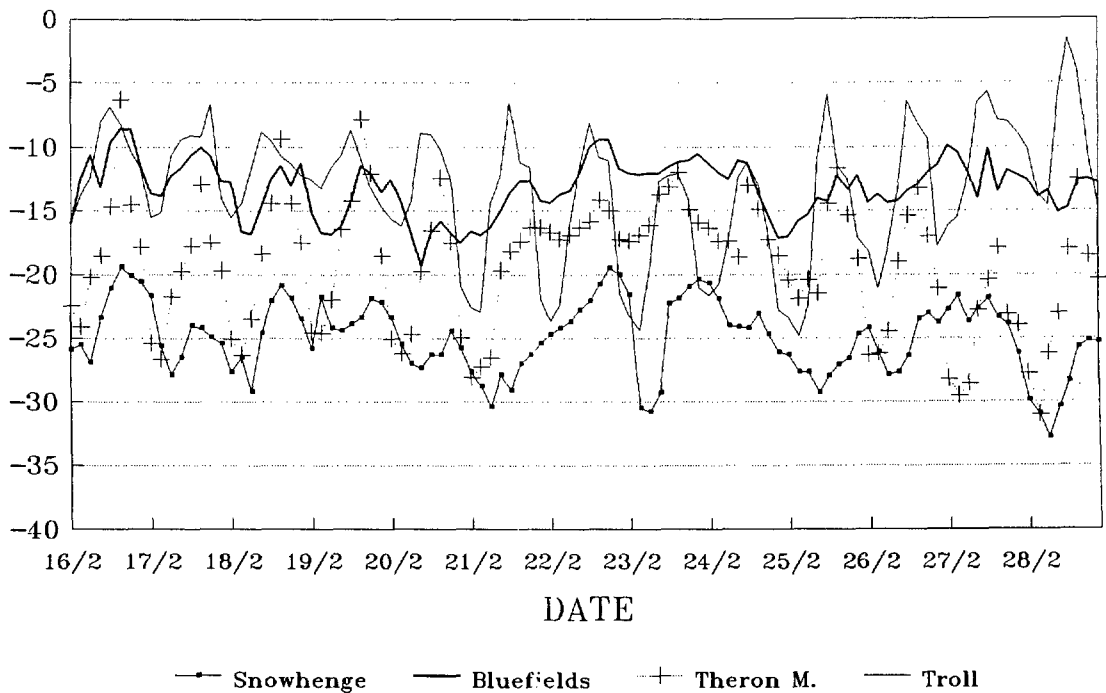
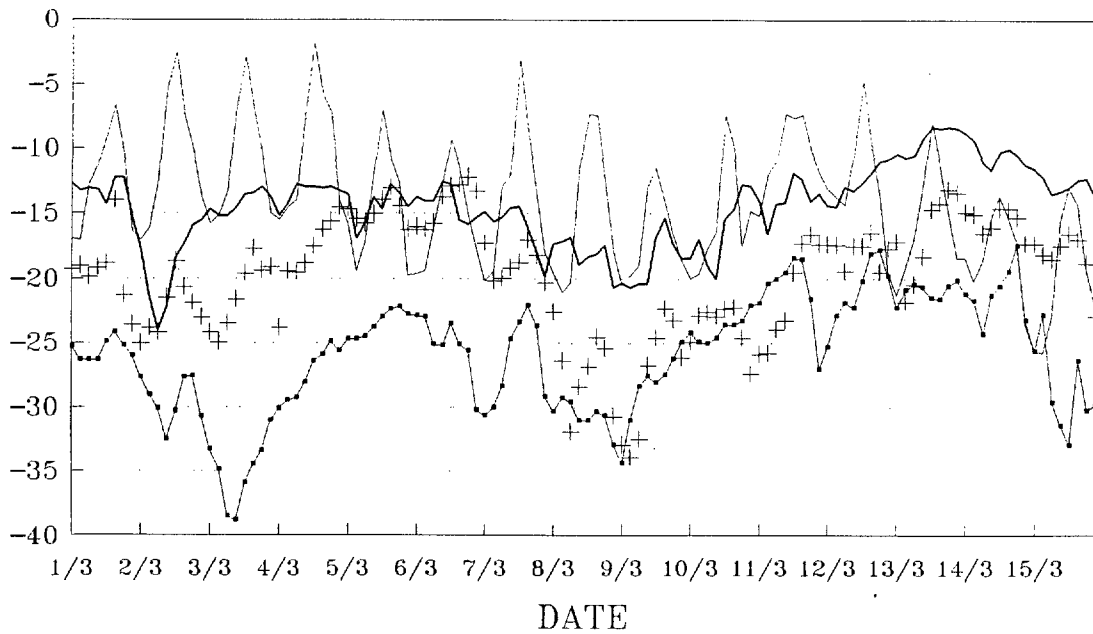


Figure 4. Time series of temperature February 1993.

1.-15. MARCH 1993

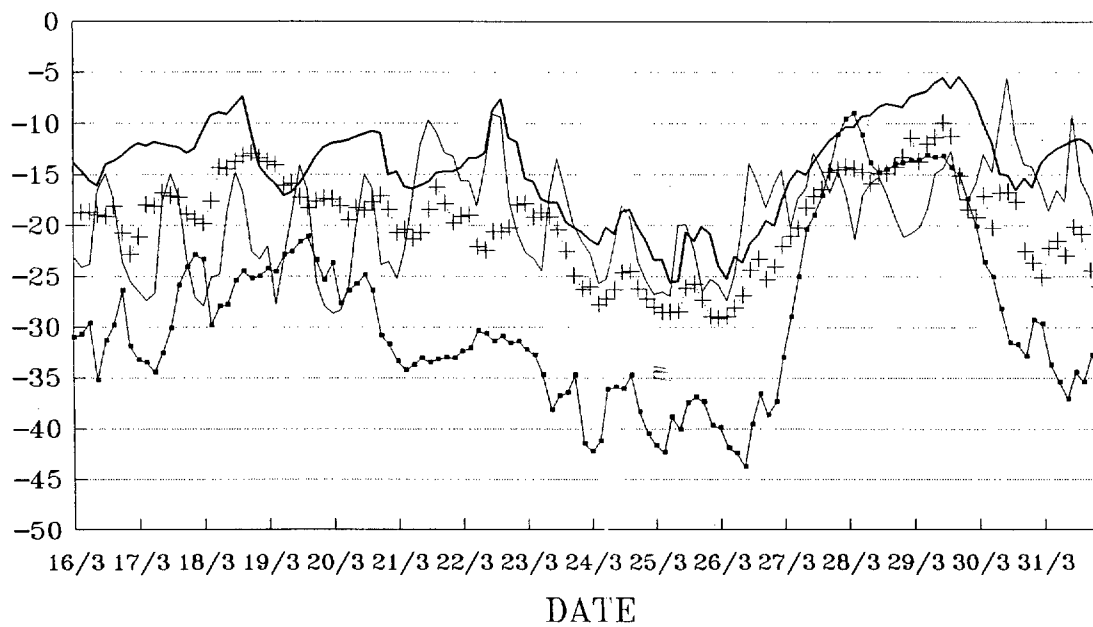
TEMPERATURE, C



—•— Snowhenge — Bluefields + Theron M. — Troll

16.-31. MARCH 1993

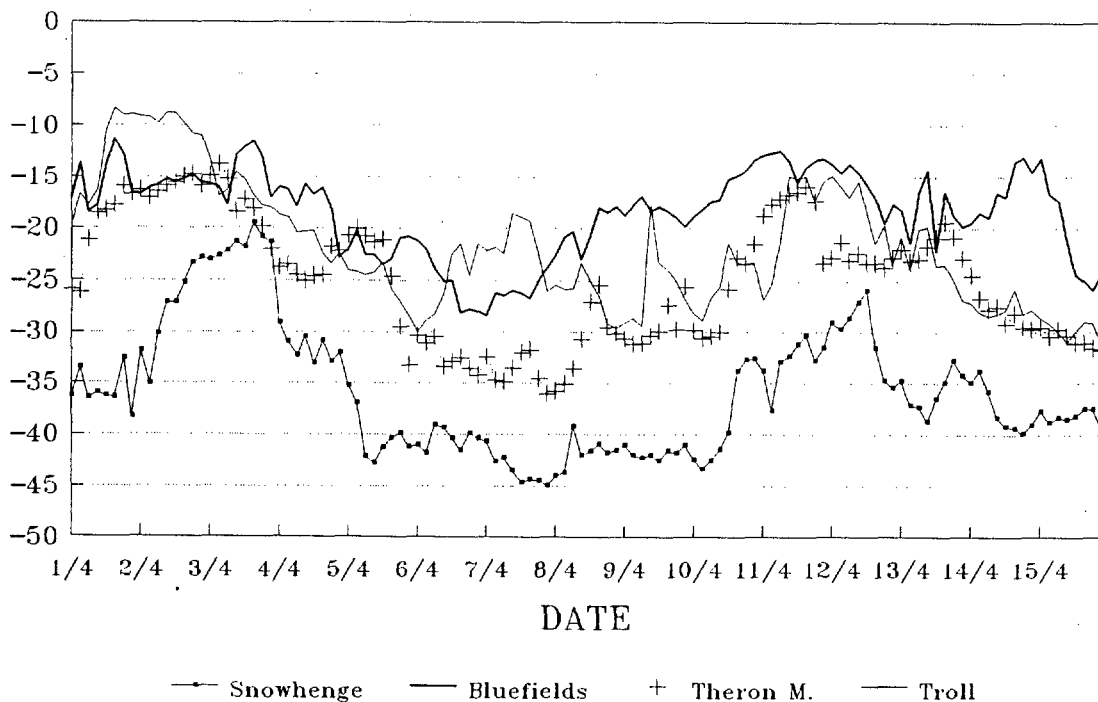
TEMPERATURE, C



—•— Snowhenge — Bluefields + Theron M. — Troll

Figure 5. Time series of temperature March 1993.

1.-15. APRIL 1993 TEMPERATURE, C



16.-30. APRIL 1993 TEMPERATURE, C

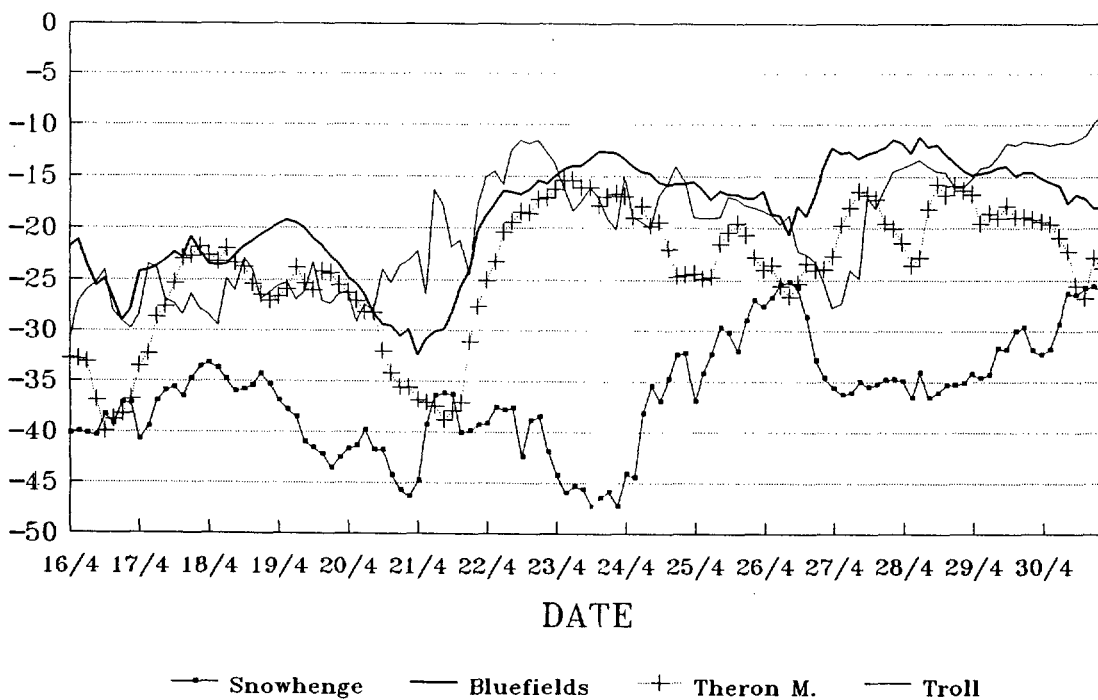
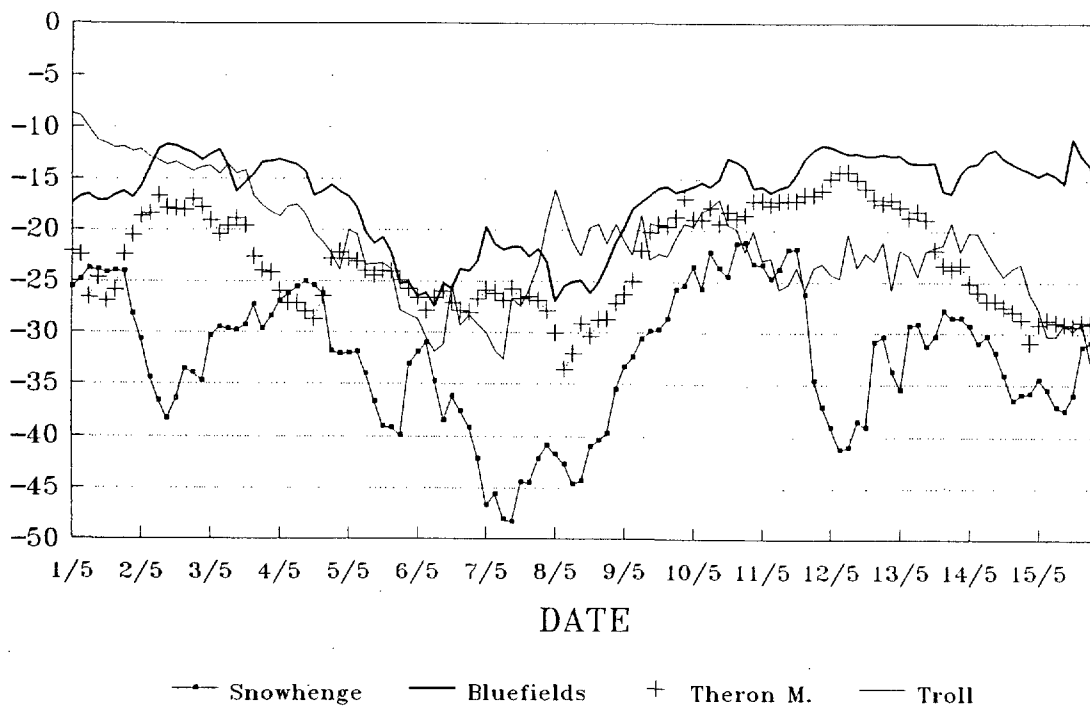


Figure 6. Time series of temperature April 1993.

1.-15. MAY 1993 TEMPERATURE, C



16.-31. MAY 1993 TEMPERATURE, C

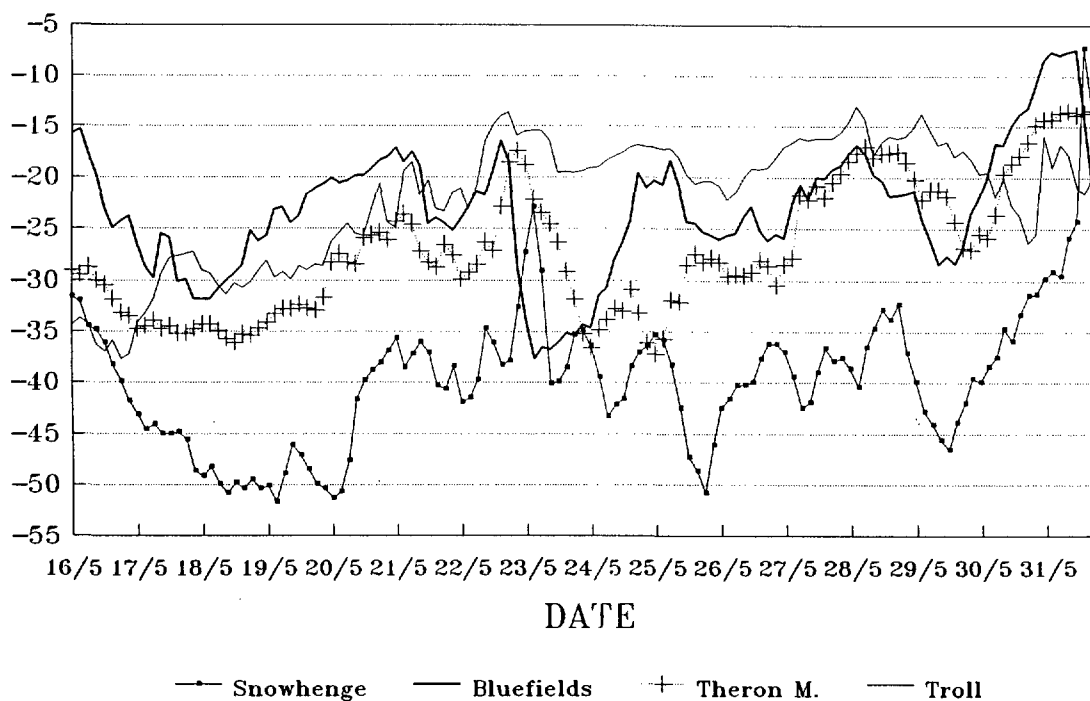
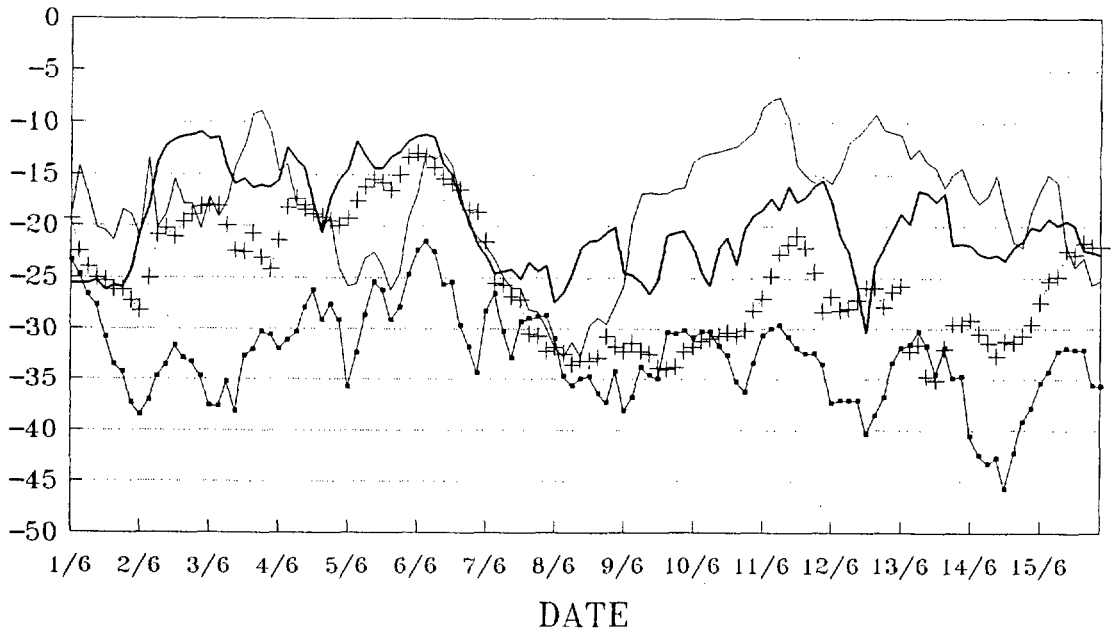


Figure 7. Time series of temperature May 1993.

1.-15. JUNE 1993

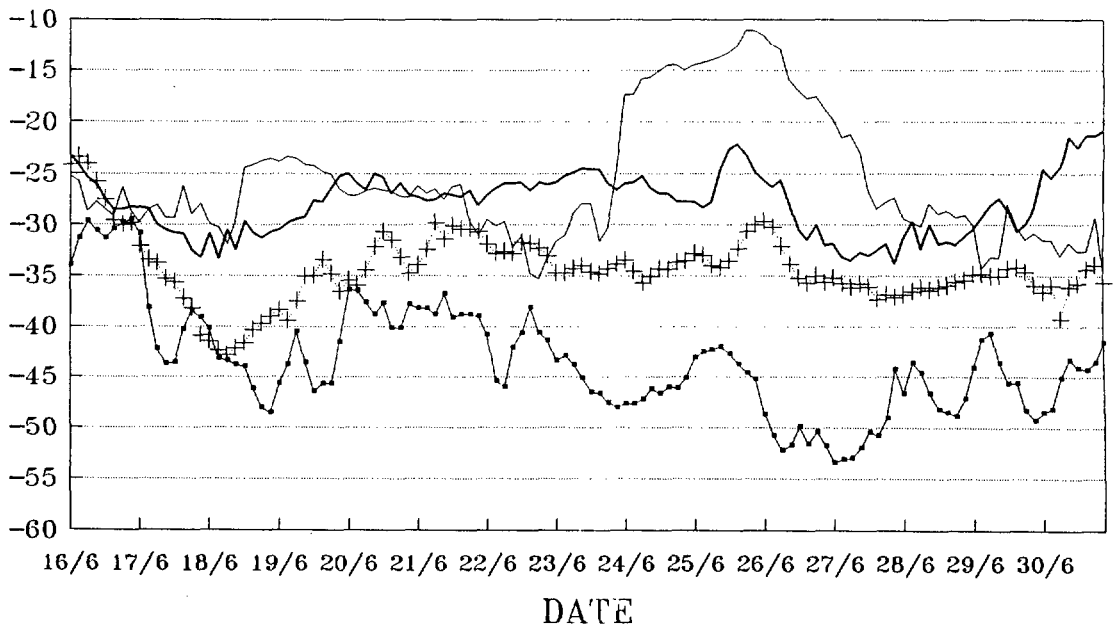
TEMPERATURE, C



—•— Snowhenge — Bluefields + Theron M. — Troll

16.-30. JUNE 1993

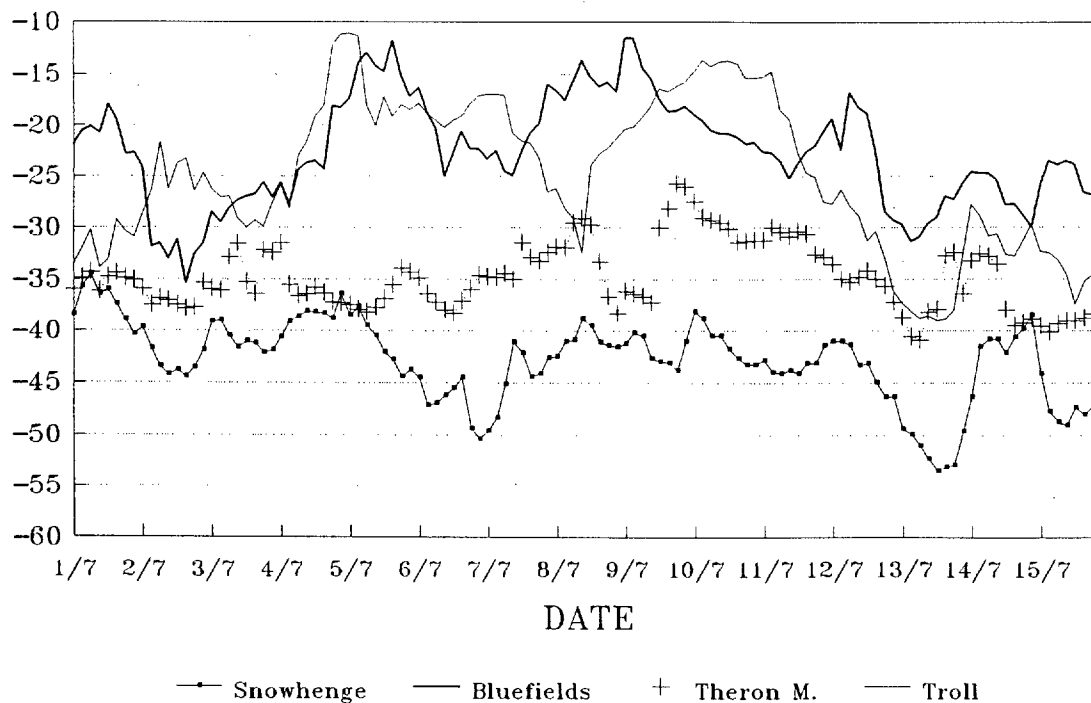
TEMPERATURE, C



—•— Snowhenge — Bluefields + Theron M. — Troll

Figure 8. Time series of temperature June 1993.

1.-15. JULY 1993
TEMPERATURE, C



16.-31. JULY 1993
TEMPERATURE, C

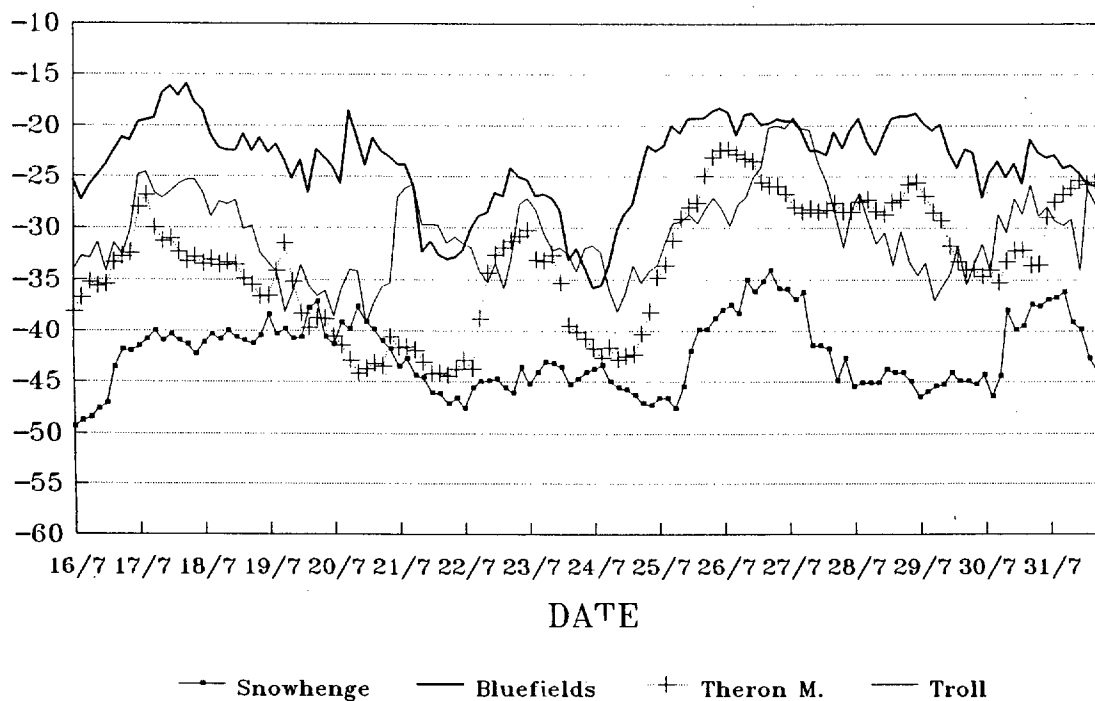
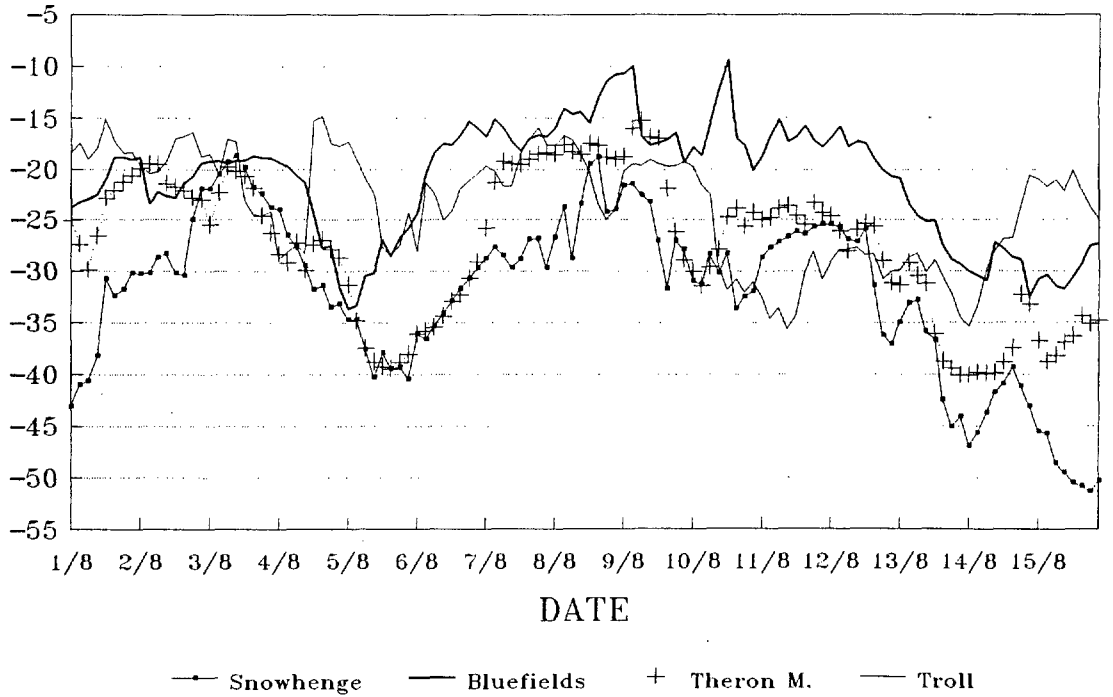


Figure 9. Time series of temperature July 1993.

1.-15. AUGUST 1993

TEMPERATURE, C



16.-31. AUGUST 1993

TEMPERATURE, C

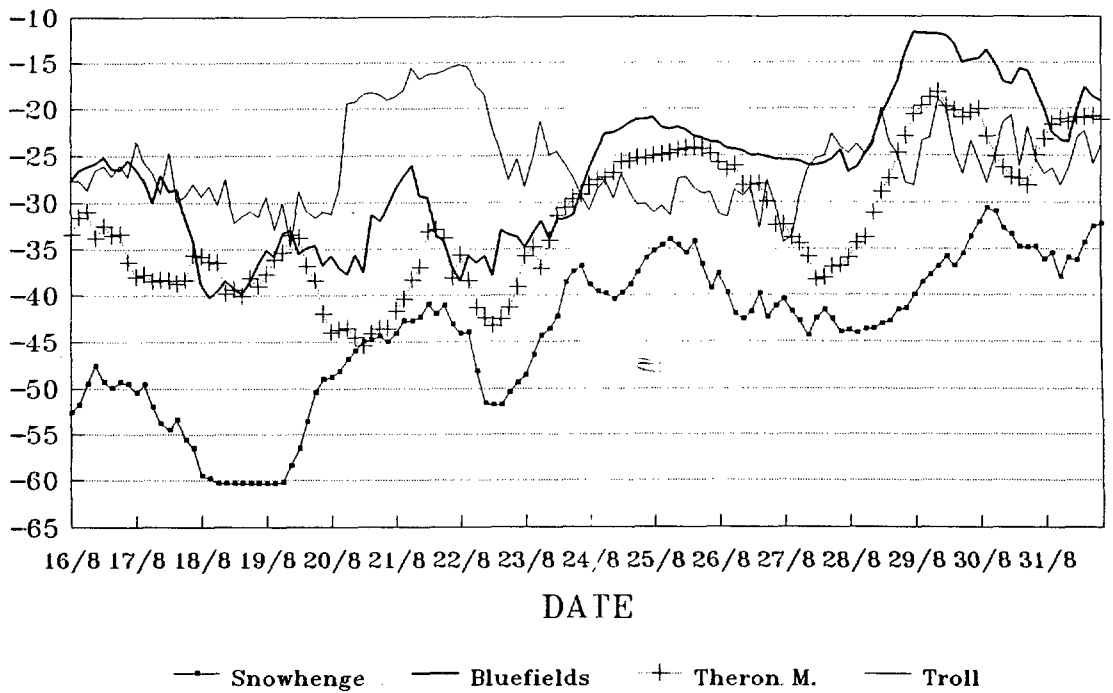
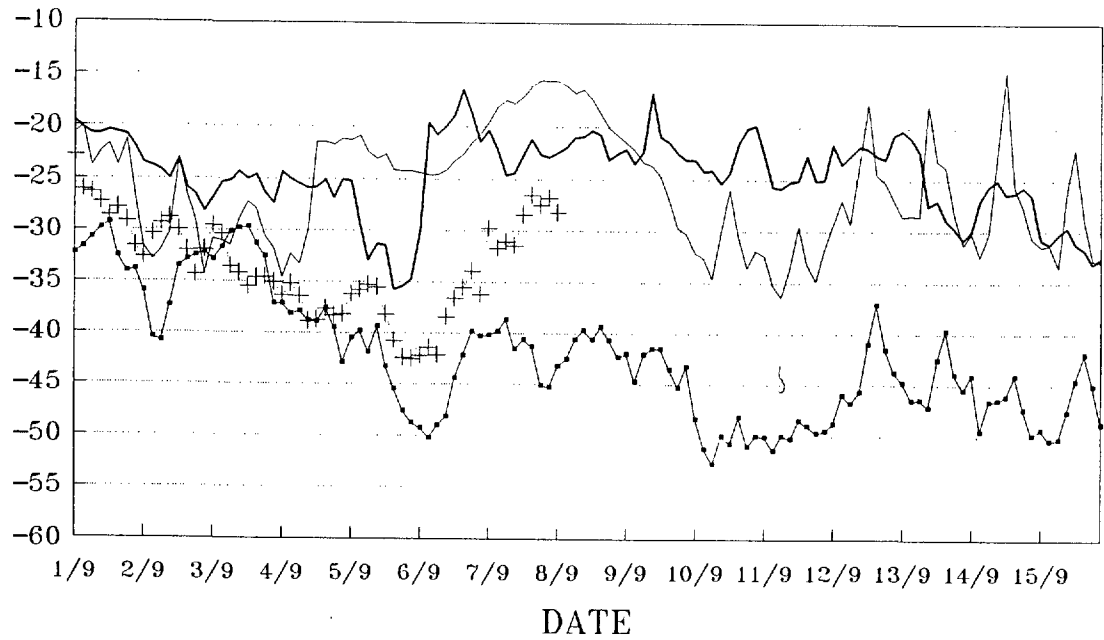


Figure 10. Time series of temperature August 1993.

1.-15. SEPTEMBER 1993

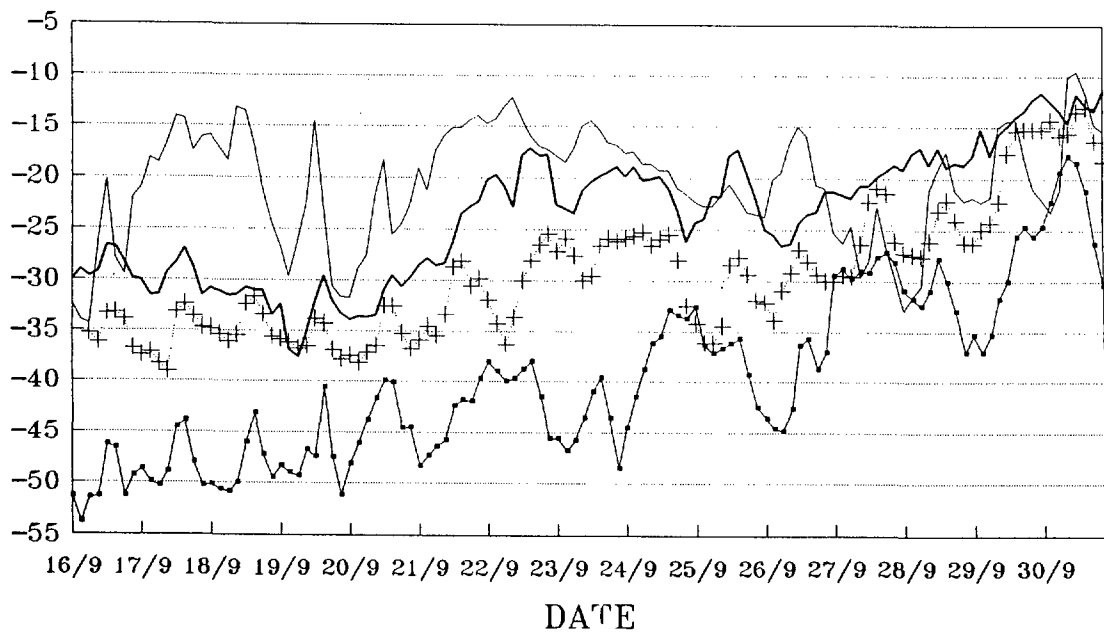
TEMPERATURE, C



—•— Snowhenge — Bluefields + Theron M. — Troll

16.-30. SEPTEMBER 1993

TEMPERATURE, C

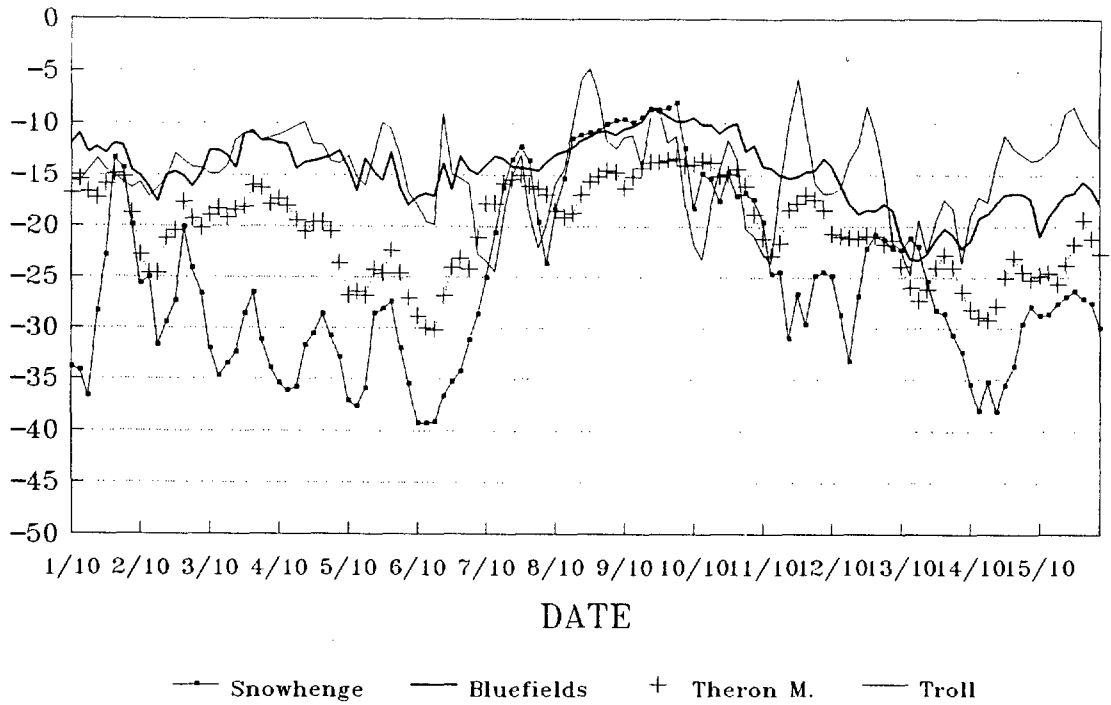


—•— Snowhenge — Bluefields + Theron M. — Troll

Figure 11. Time series of temperature September 1993.

1.-15.OCTOBER 1993

TEMPERATURE, C



16.-31. OCTOBER 1993

TEMPERATURE, C

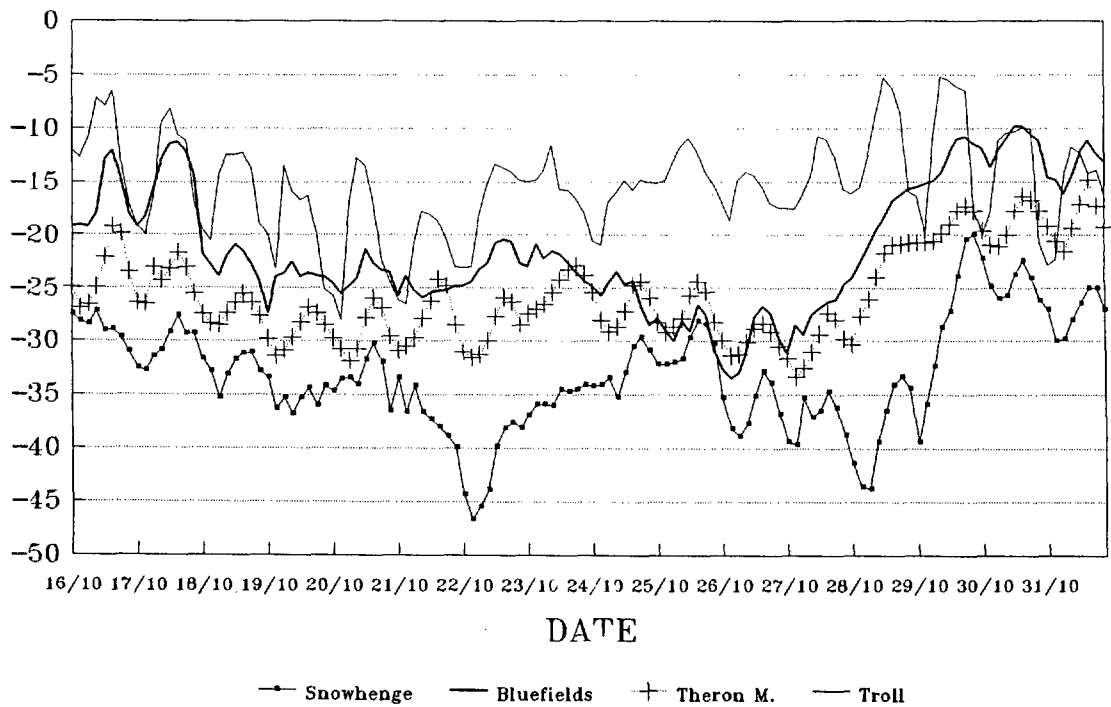
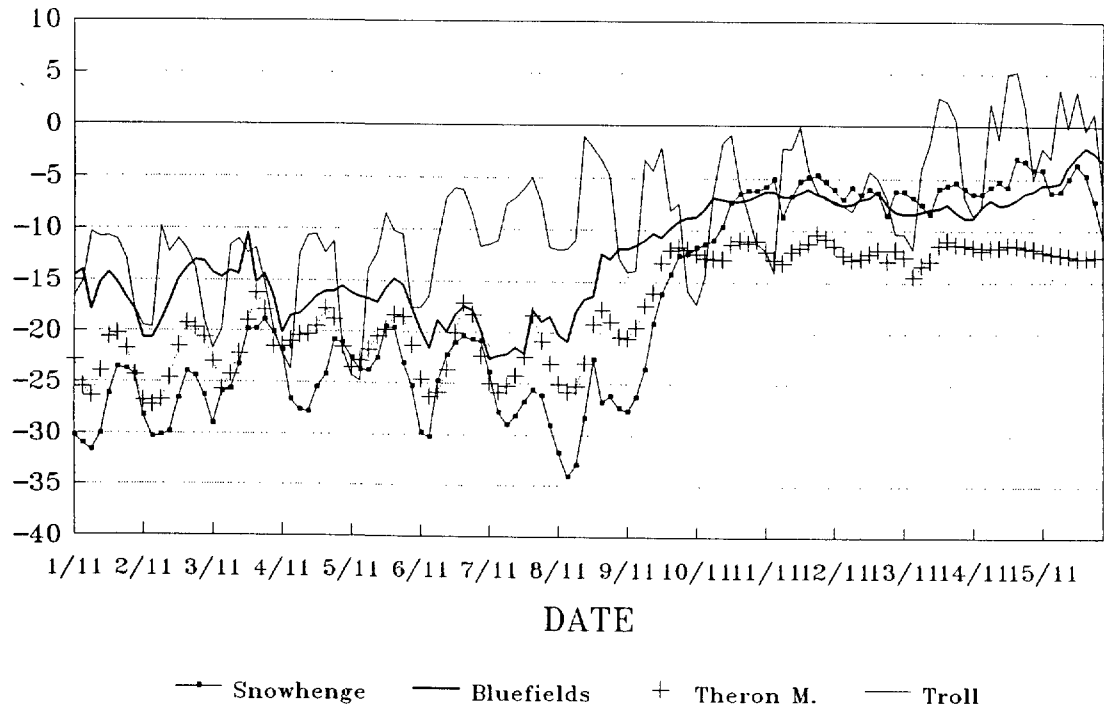


Figure 12. Time series of temperature October 1993.

1.-15. NOVEMBER 1993

TEMPERATURE, C



16.-30. NOVEMBER 1993

TEMPERATURE, C

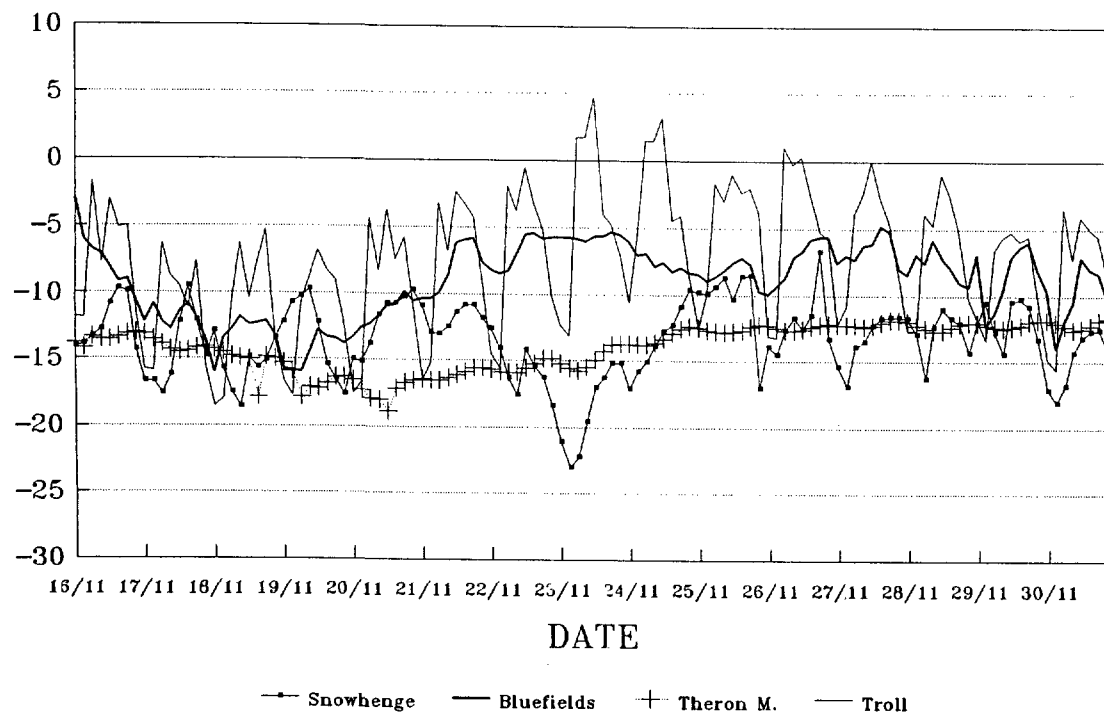
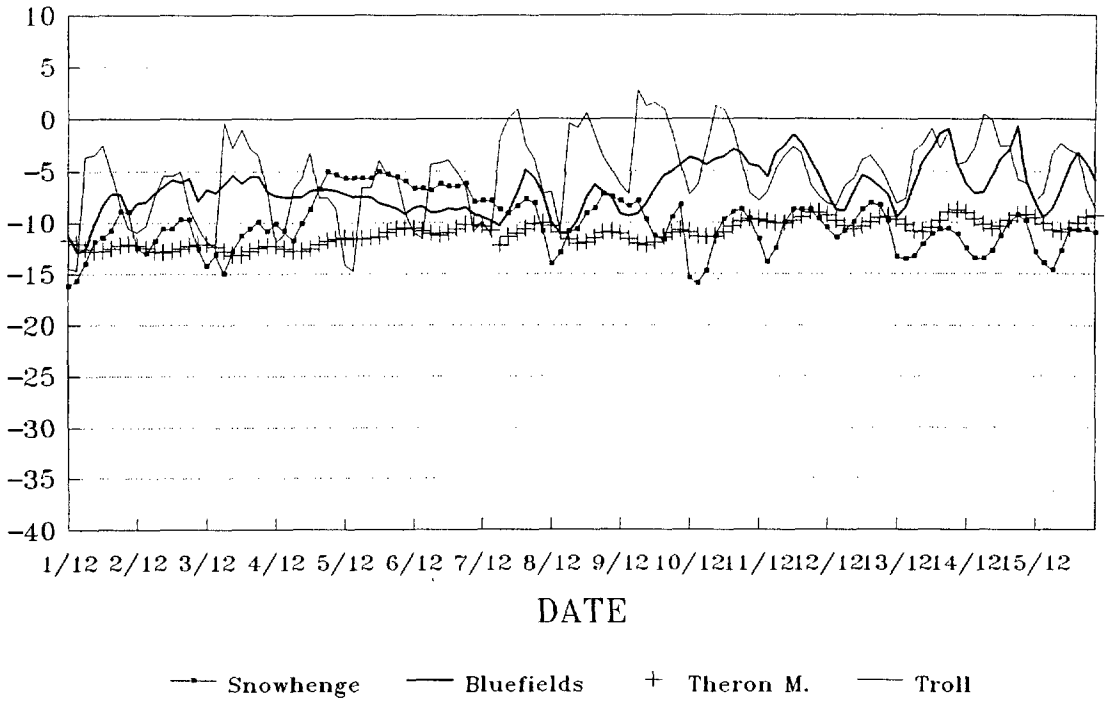


Figure 13. Time series of temperature November 1993.

1.-15. DECEMBER 1993

TEMPERATURE, C



16.-31. DECEMBER 1993

TEMPERATURE, C

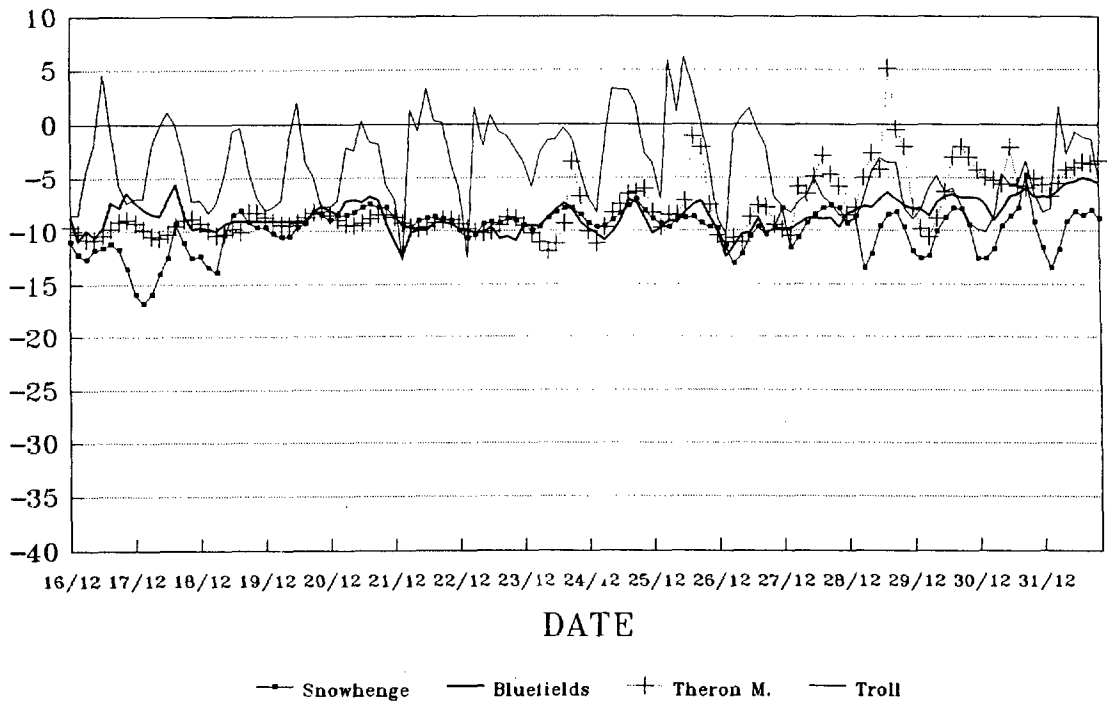
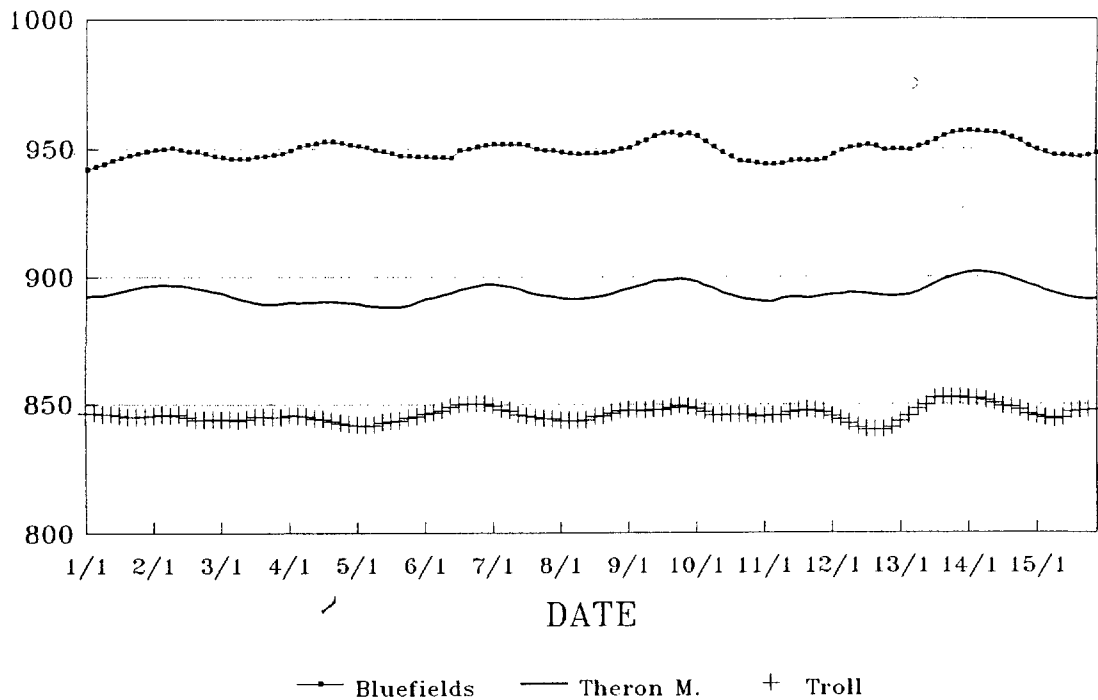


Figure 14. Time series of temperature December 1993.

1.-15. JANUARY 1993

PRESSURE, MB



16.-31. JANUARY 1993

PRESSURE, MB

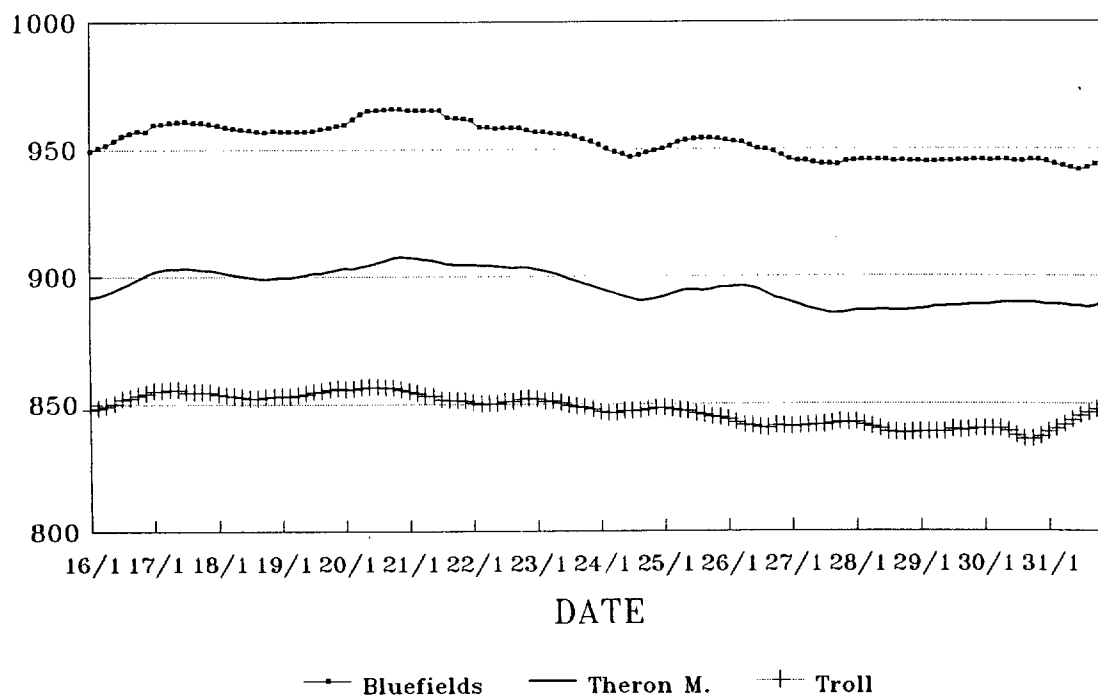
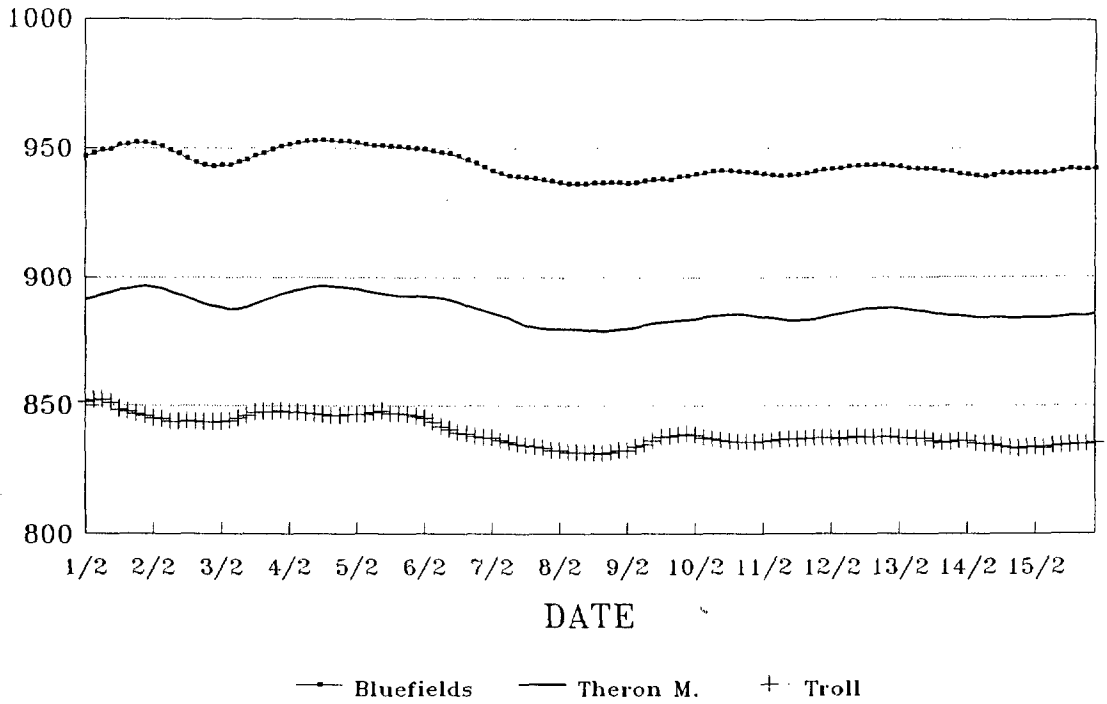


Figure 15. Time series of air pressure January 1993.

1.-15. FEBRUARY 1993

PRESSURE, MB



16.-28. FEBRUARY 1993

PRESSURE, MB

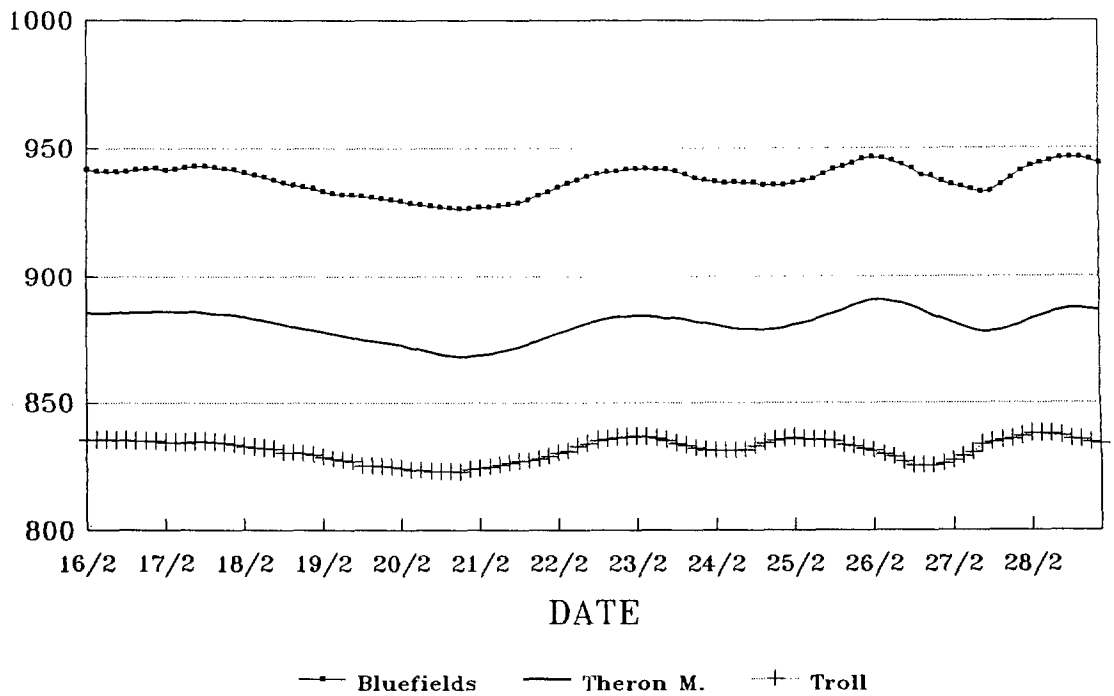
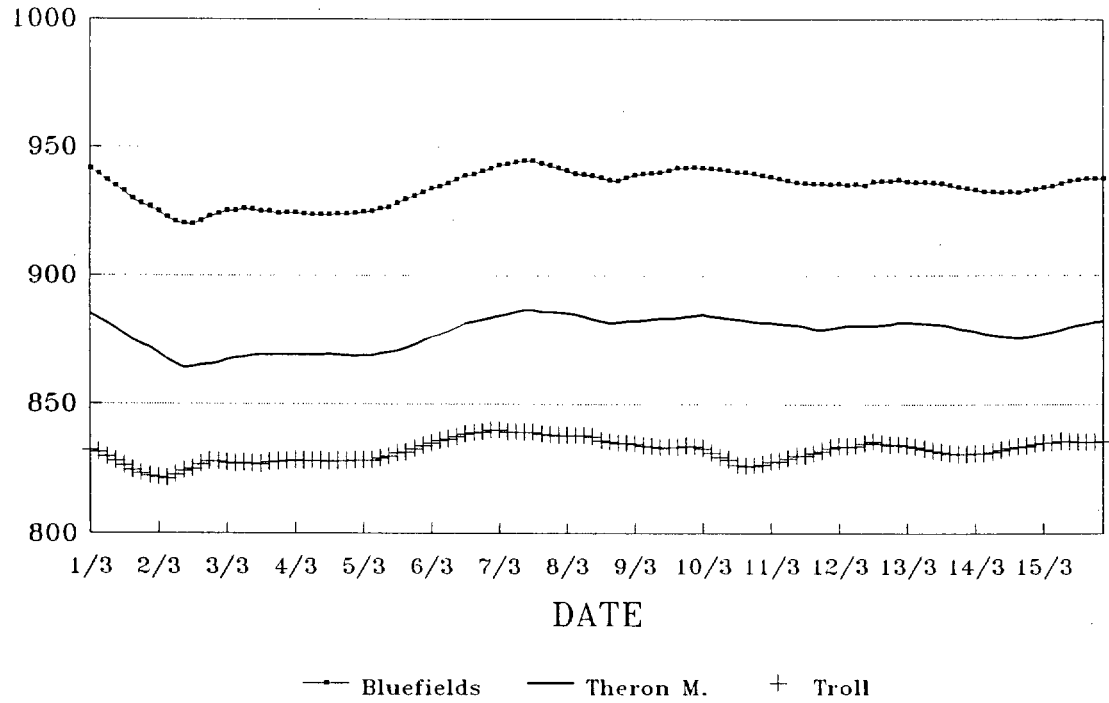


Figure 16. Time series of air pressure February 1993.

1.-15. MARCH 1993
PRESSURE, MB



16.-31. MARCH 1993
PRESSURE, MB

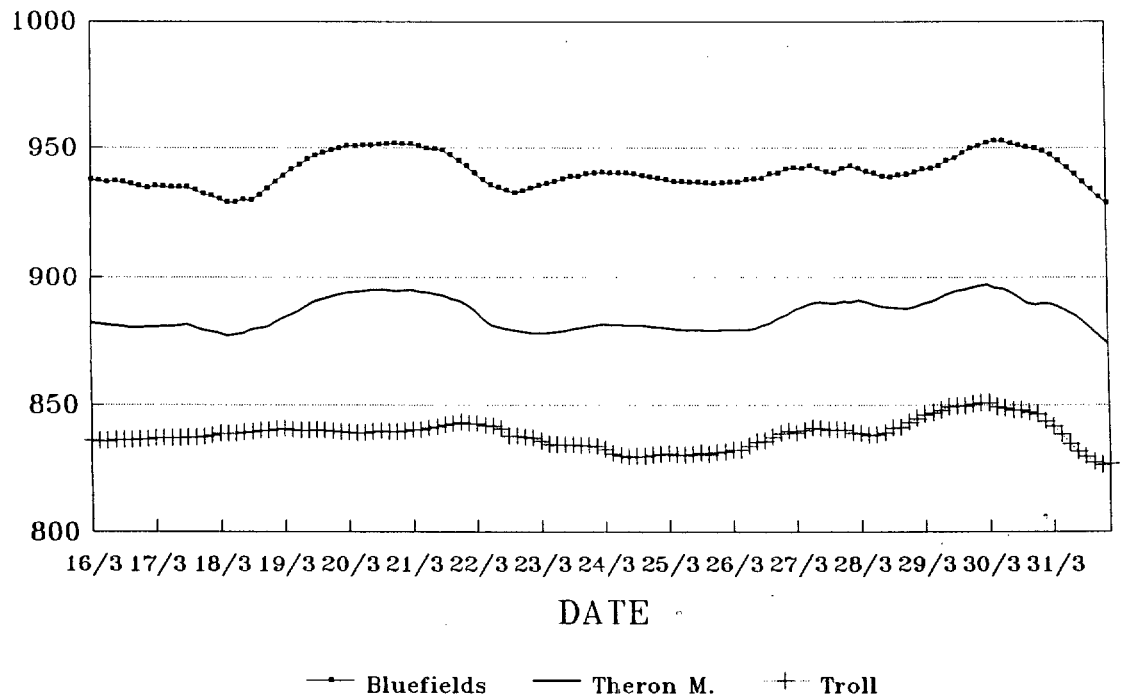
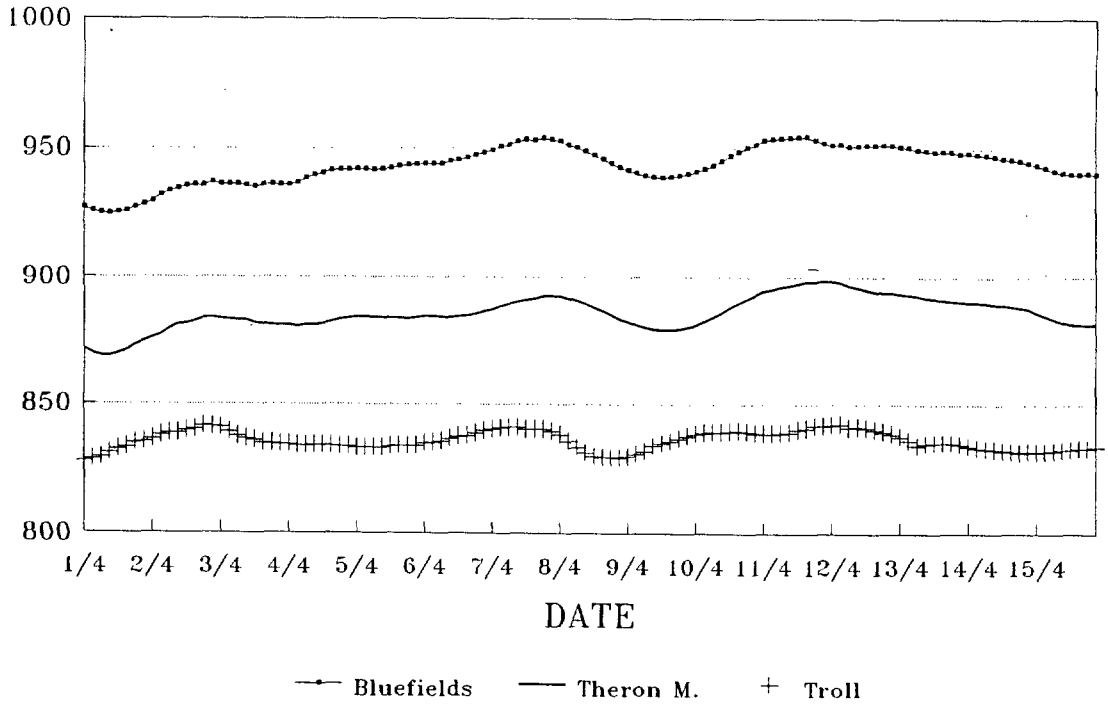


Figure 17. Time series of air pressure March 1993.

1.-15. APRIL 1993

PRESSURE, MB



16.-30. APRIL 1993

PRESSURE, MB

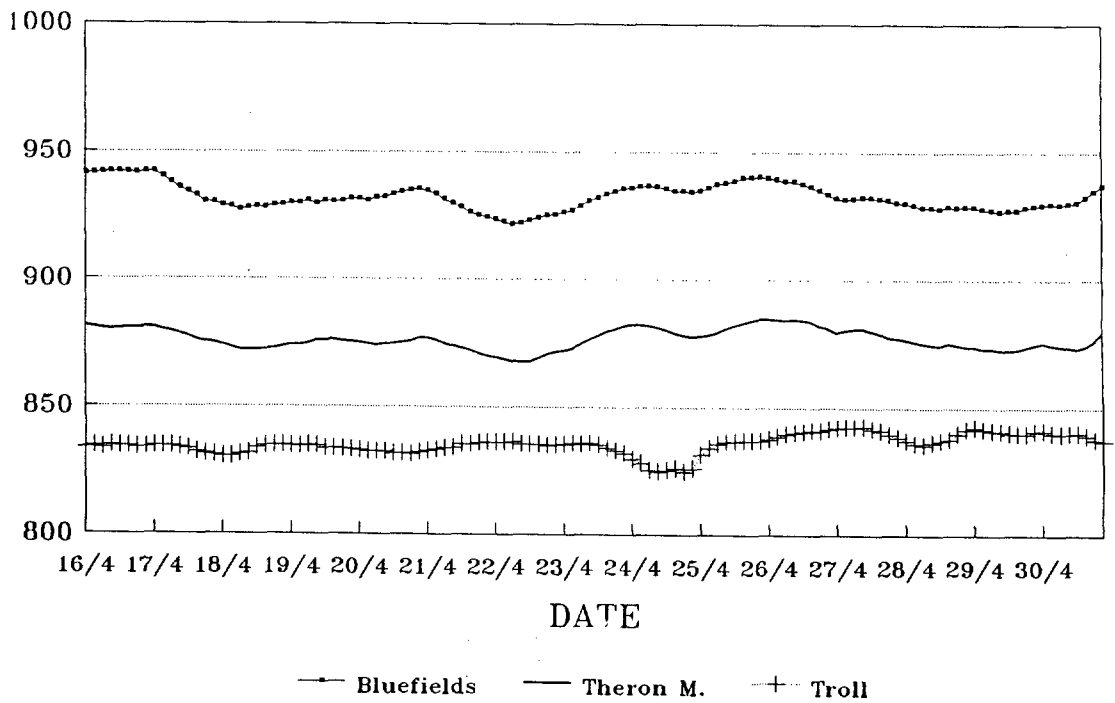
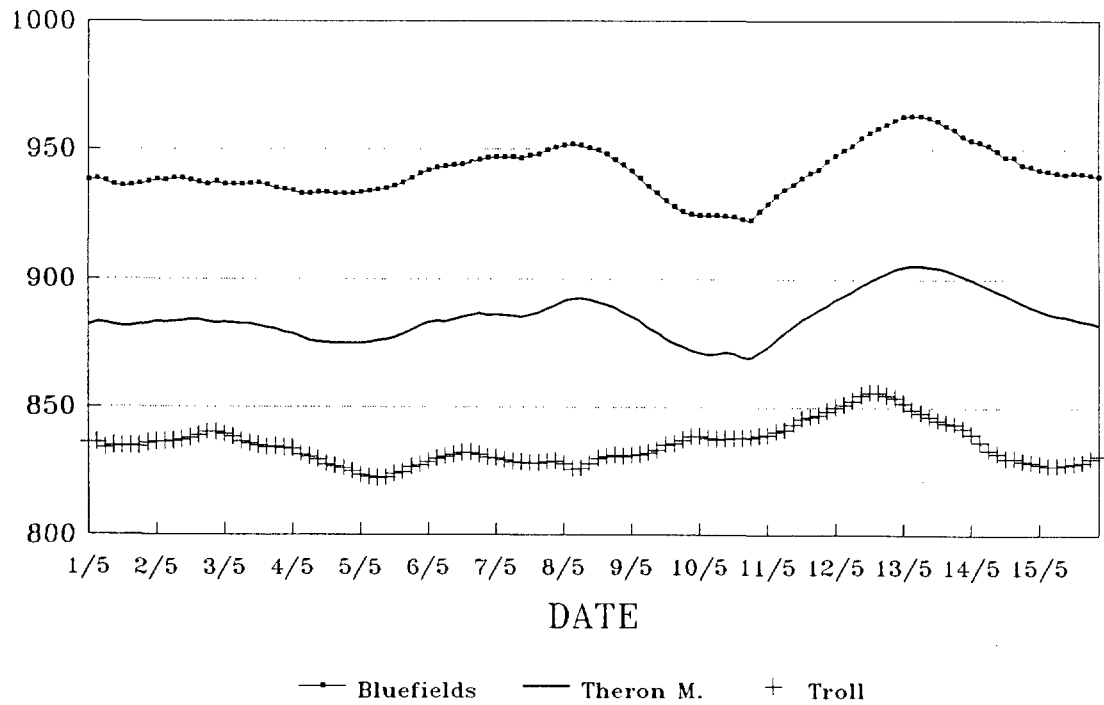


Figure 18. Time series of air pressure April 1993.

1.-15. MAY 1993 PRESSURE, MB



16.-31. MAY 1993 PRESSURE, MB

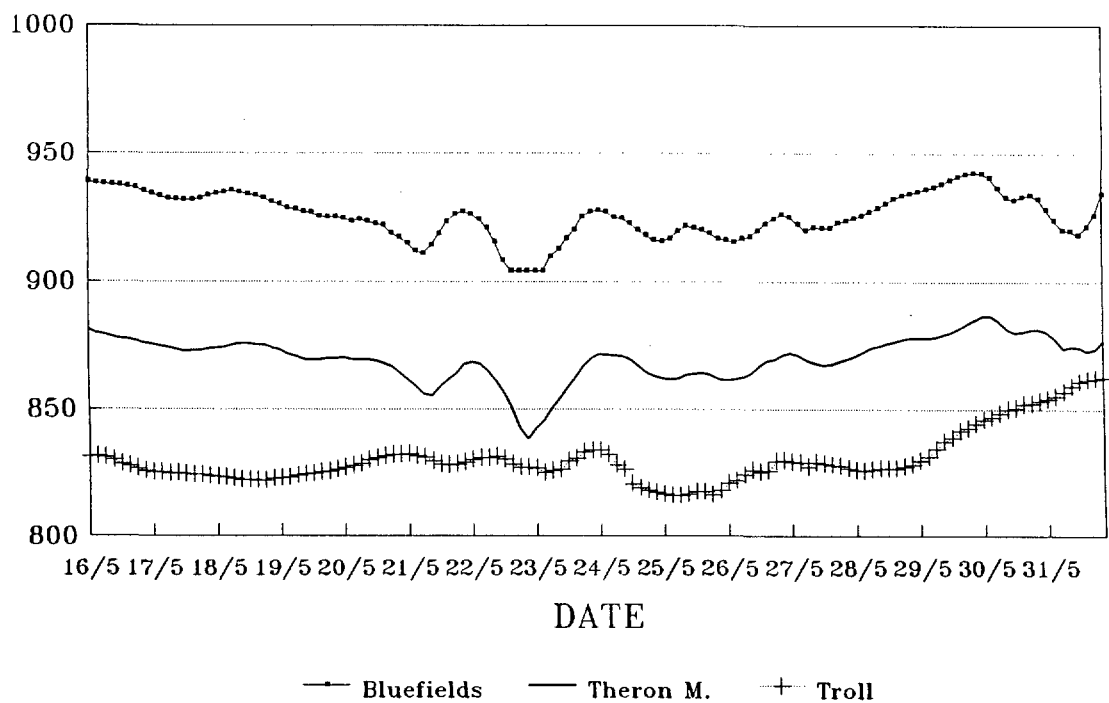
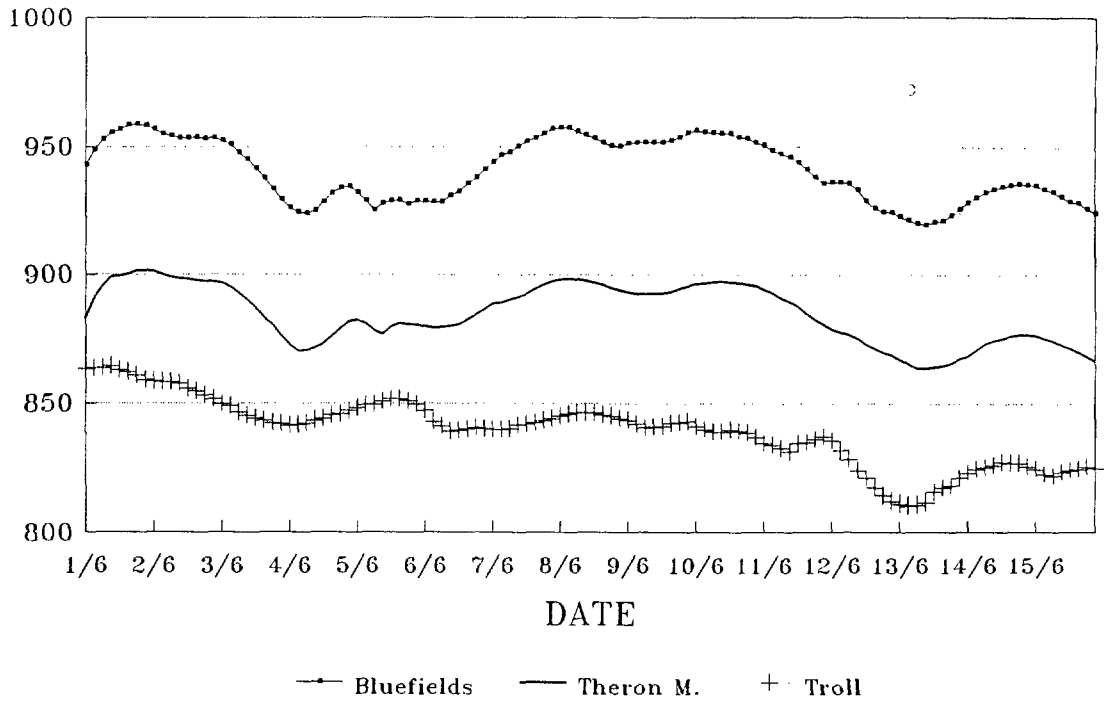


Figure 19. Time series of air pressure May 1993.

1.-15. JUNE 1993

PRESSURE, MB



16.-30. JUNE 1993

PRESSURE, MB

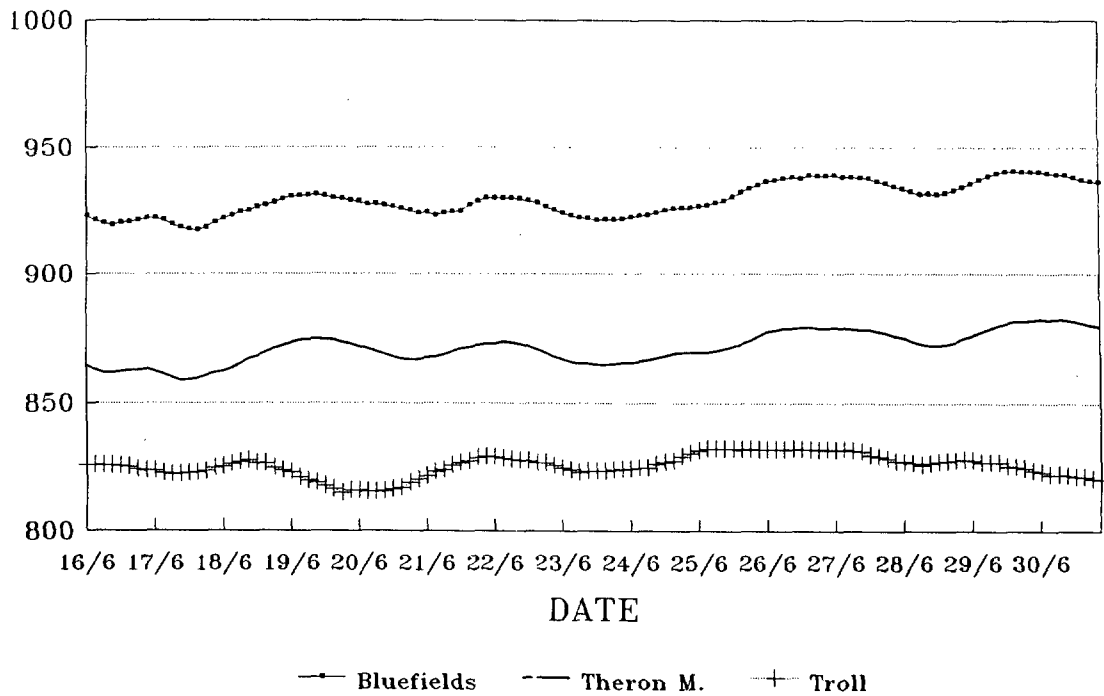
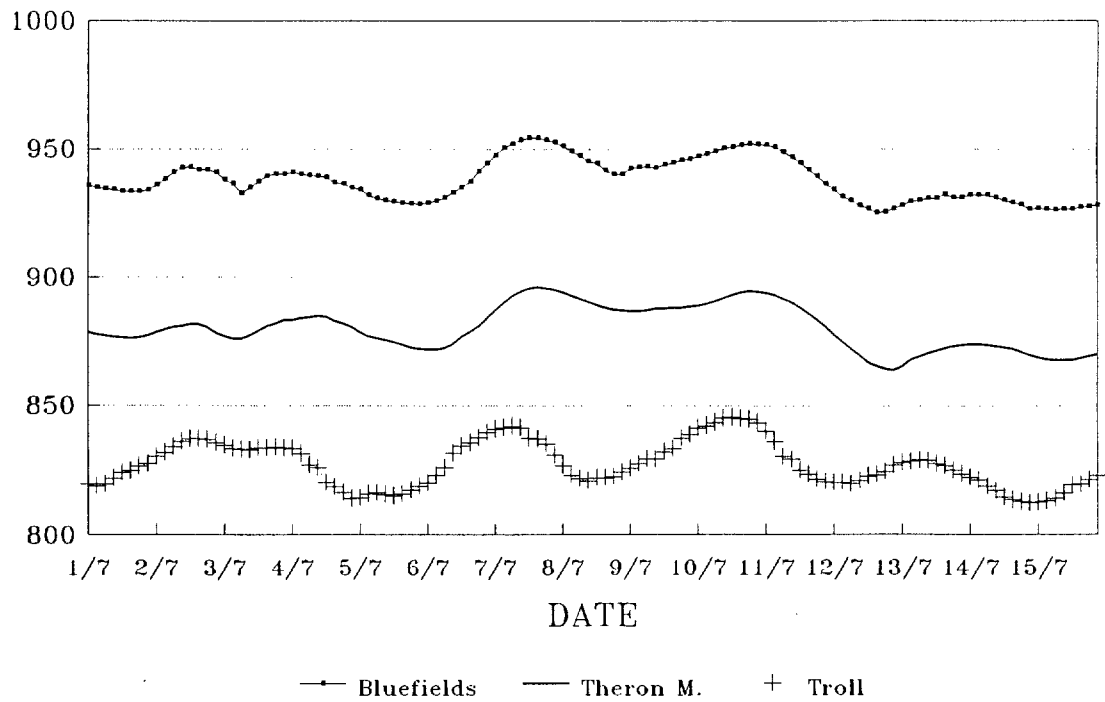


Figure 20. Time series of air pressure June 1993.

1.-15. JULY 1993

PRESSURE, MB



16.-31. JULY 1993

PRESSURE, MB

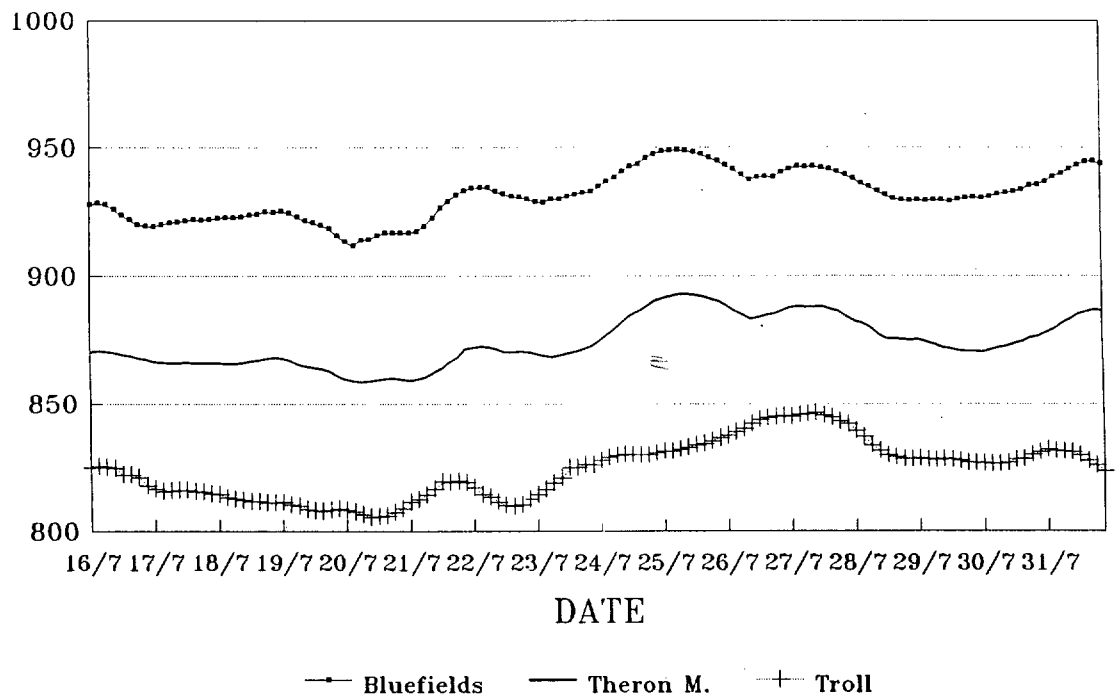
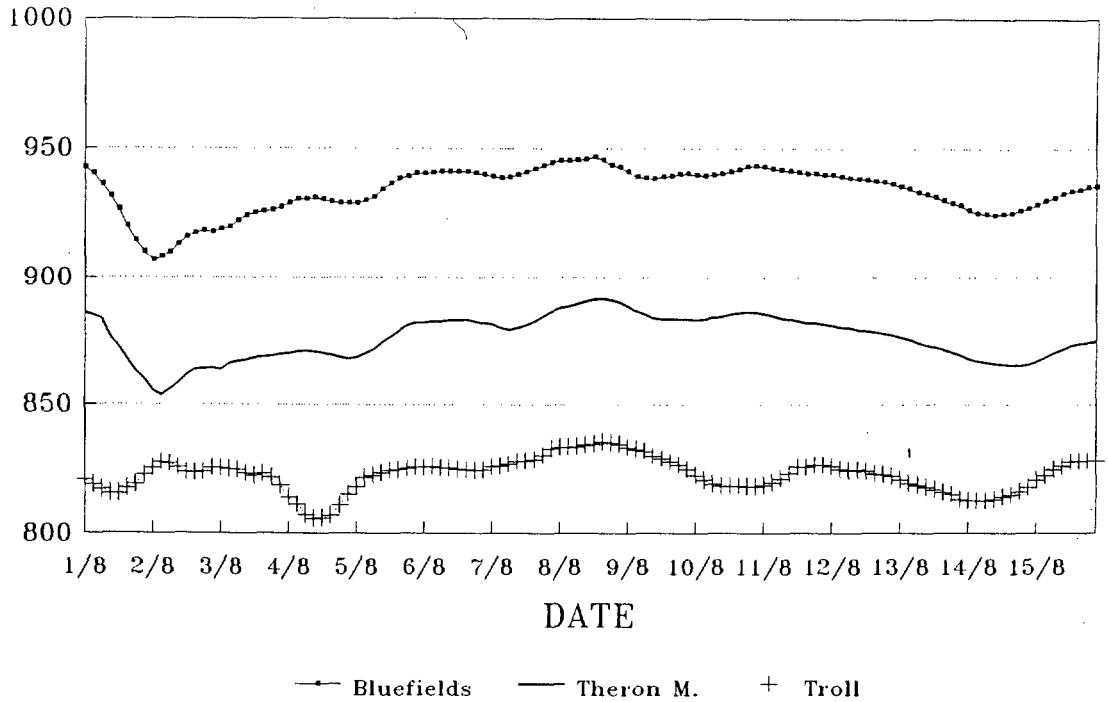


Figure 21. Time series of air pressure July 1993.

1.-15. AUGUST 1993

PRESSURE, MB



16.-31. AUGUST 1993

PRESSURE, MB

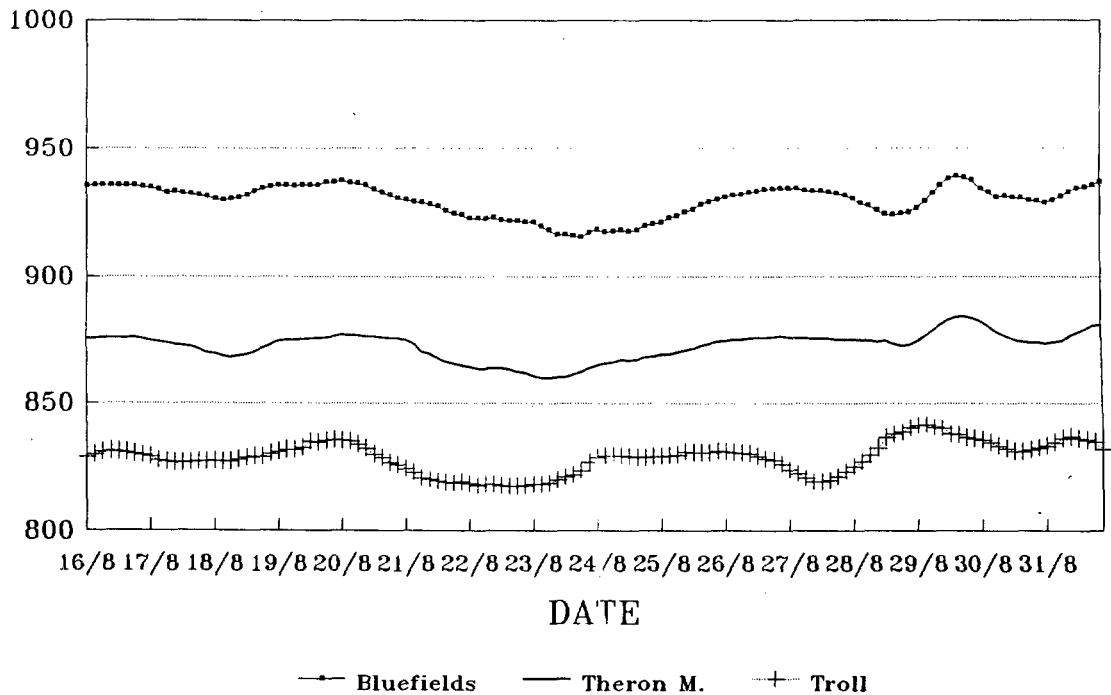
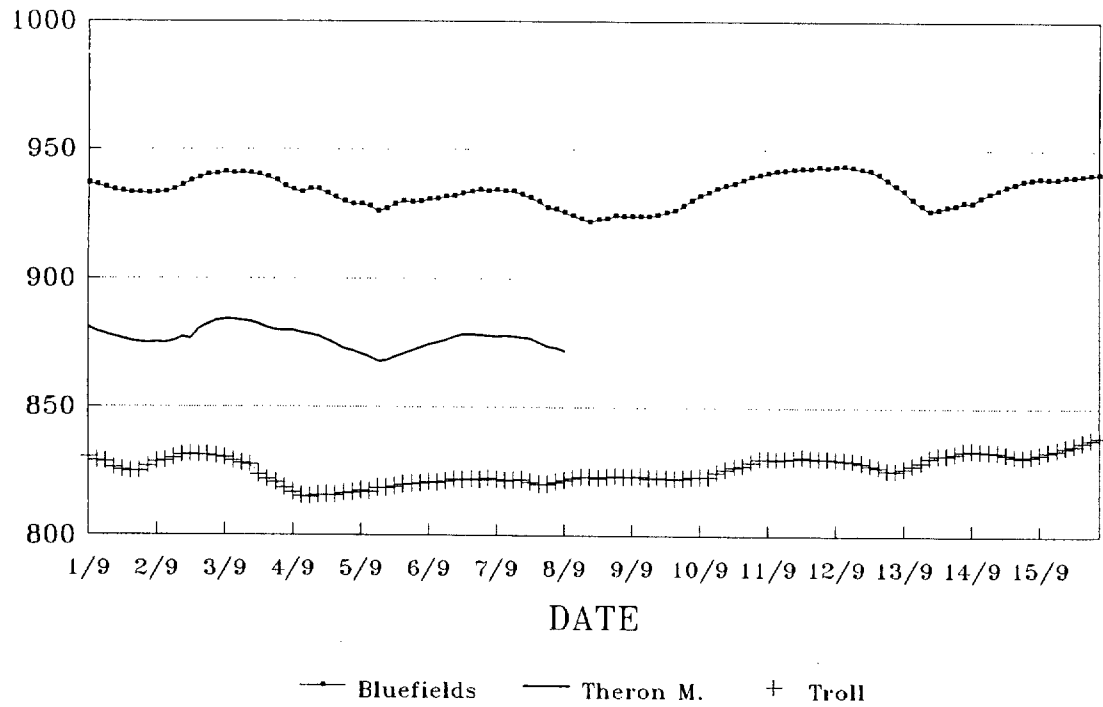


Figure 22. Time series of air pressure August 1993.

1.-15. SEPTEMBER 1993
PRESSURE, MB



16.-30. SEPTEMBER 1993
PRESSURE, MB

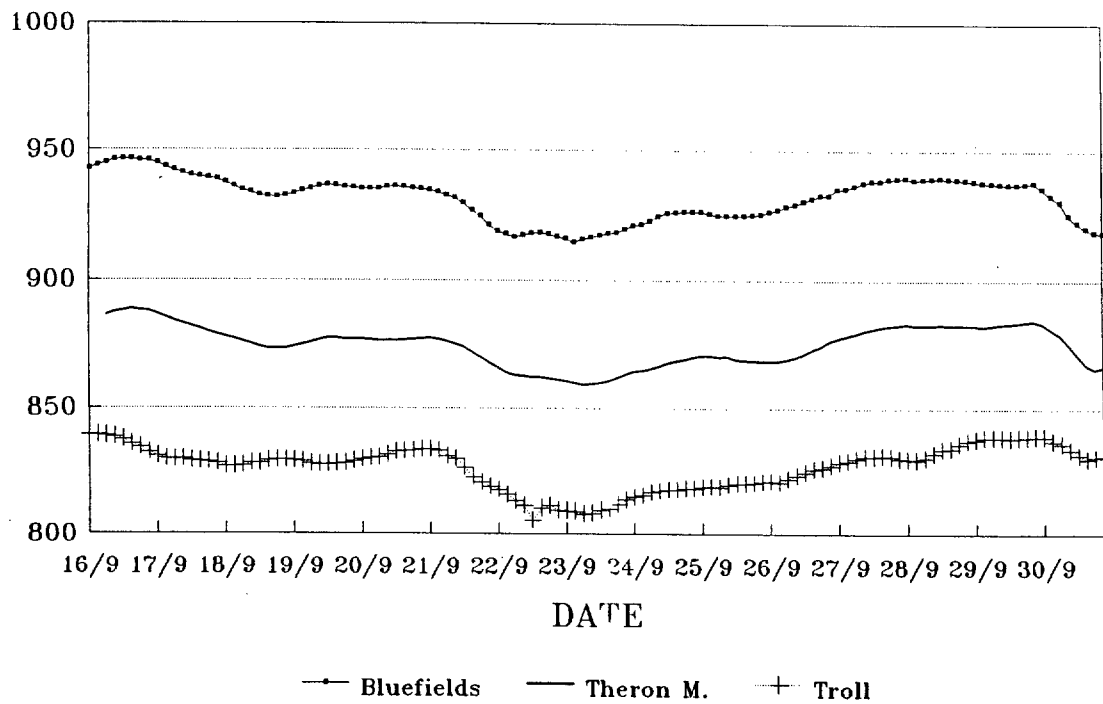
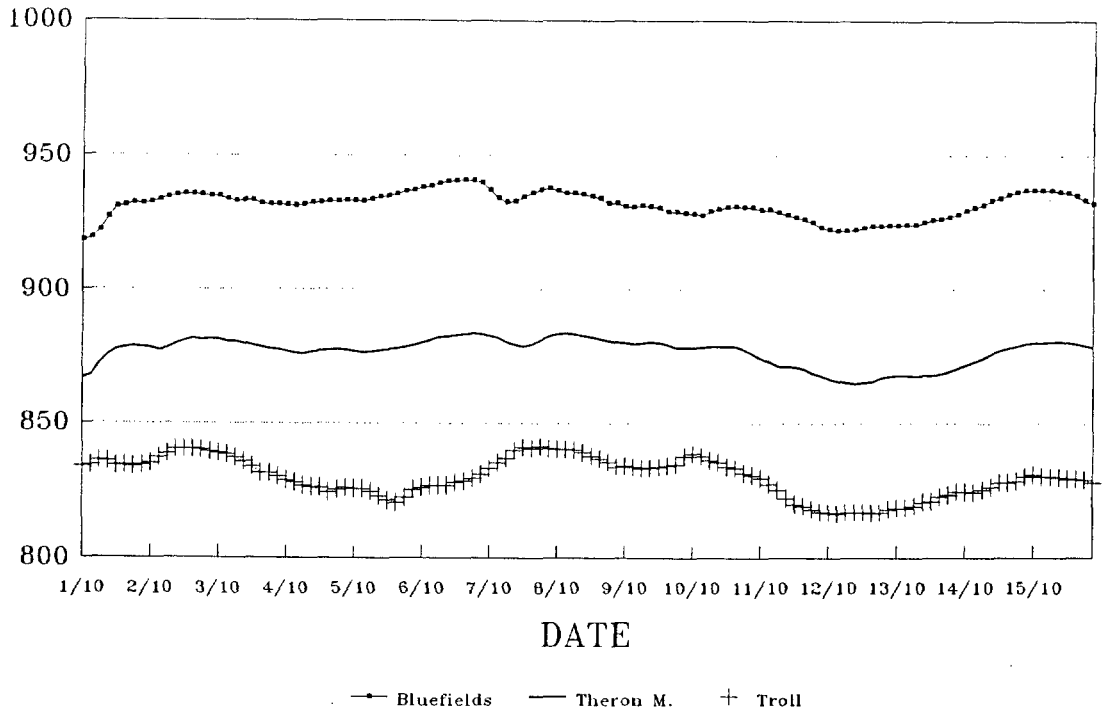


Figure 23. Time series of air pressure September 1993.

1.-15. OCTOBER 1993

PRESSURE, MB



16.-31. OCTOBER 1993

PRESSURE, MB

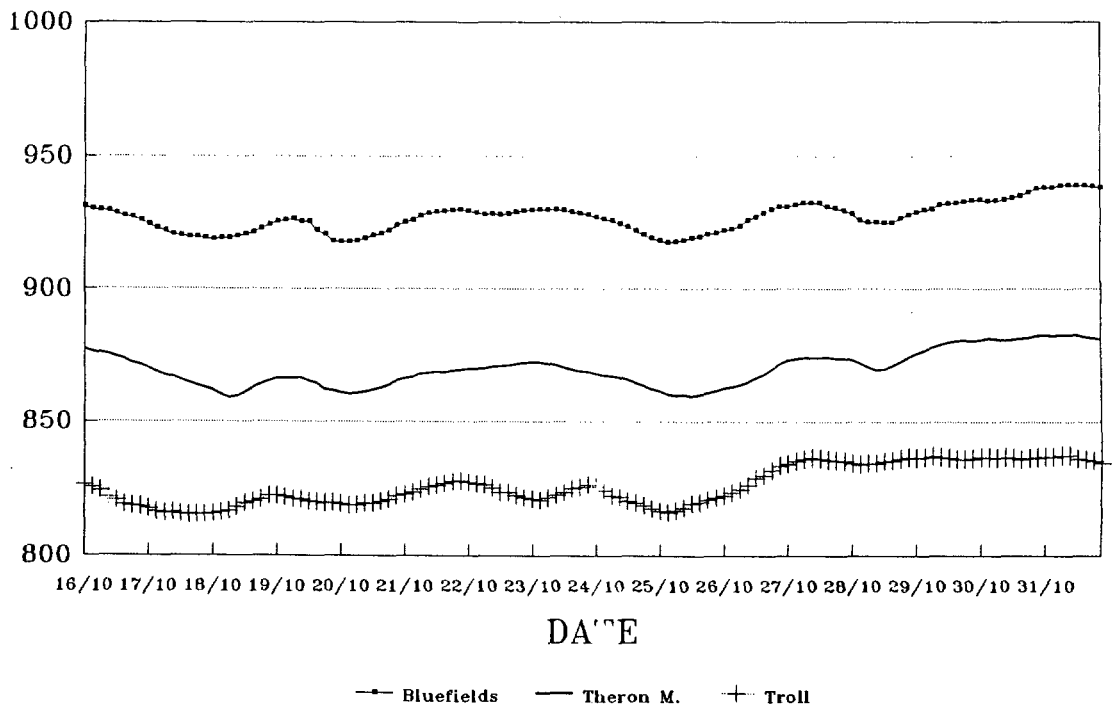
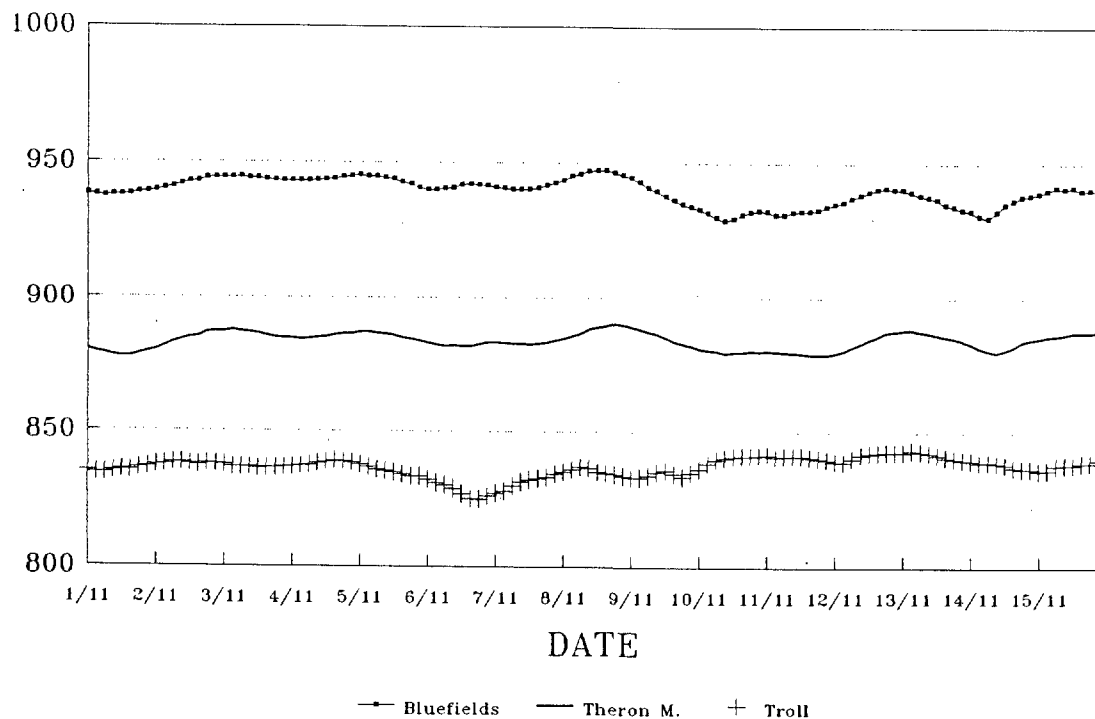


Figure 24. Time series of air pressure October 1993.

1.-15. NOVEMBER 1993
PRESSURE, MB



16.-30. NOVEMBER 1993
PRESSURE, MB

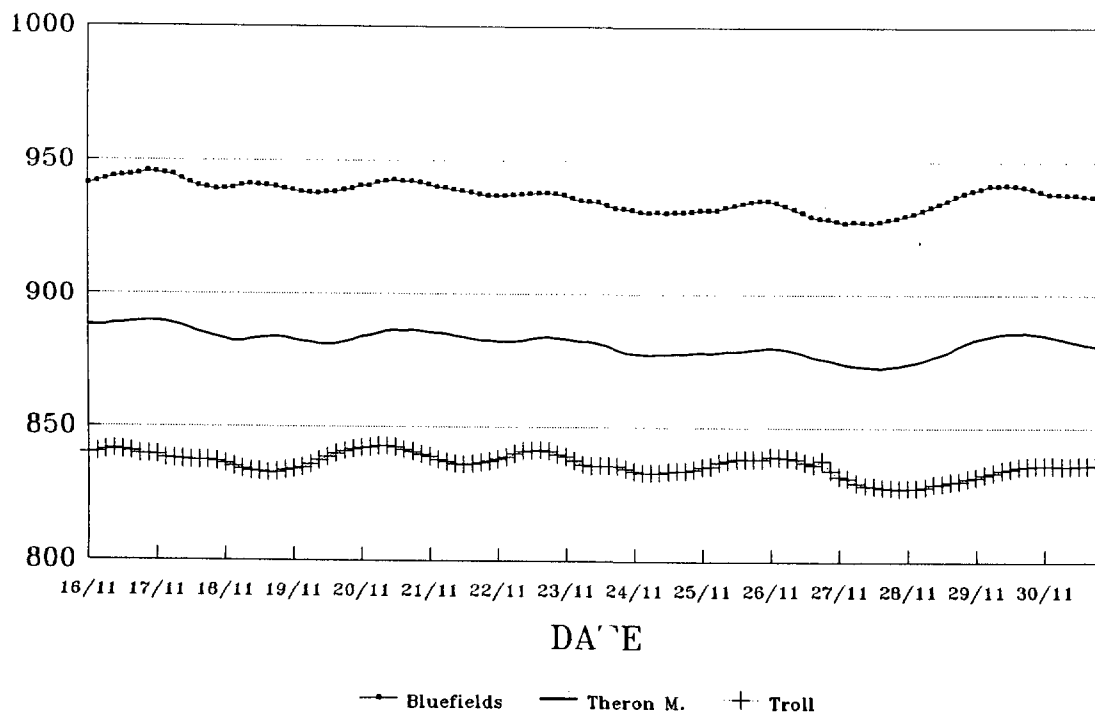
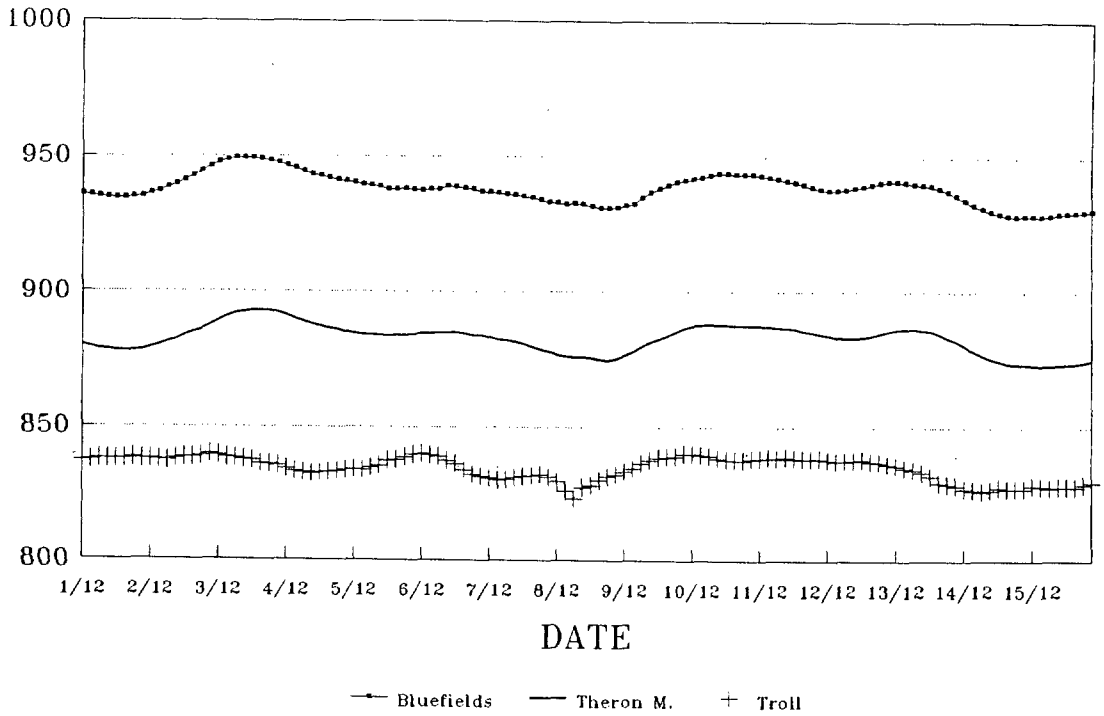


Figure 25. Time series of air pressure November 1993.

1.-15. DECEMBER 1993
PRESSURE, MB



16.-31. DECEMBER 1993
PRESSURE, MB

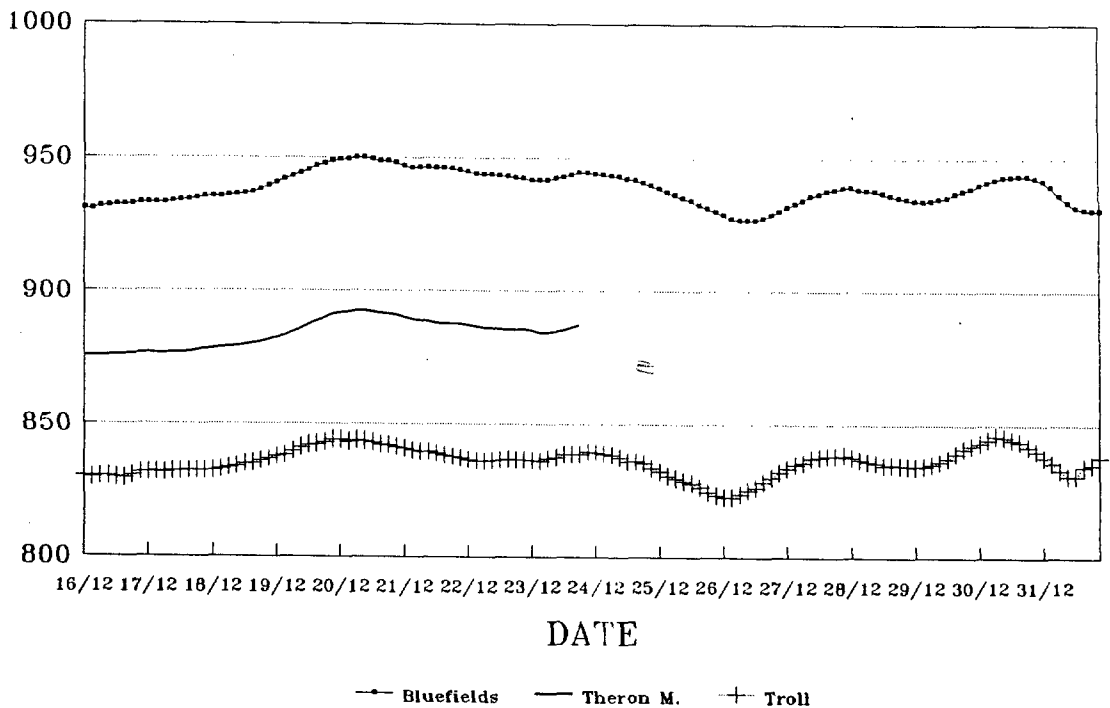
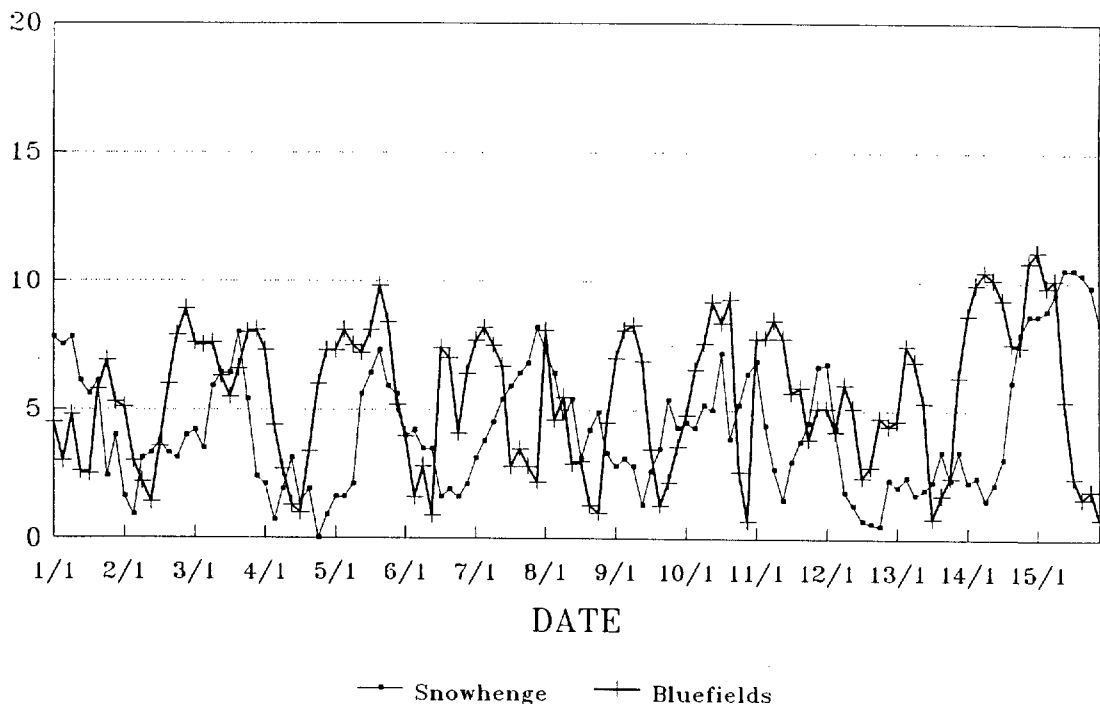


Figure 26. Time series of air pressure December 1993.

1.-15. JANUARY 1993

WIND SPEED, M/S



1.-15. JANUARY 1993

WIND DIRECTION, DEGREES

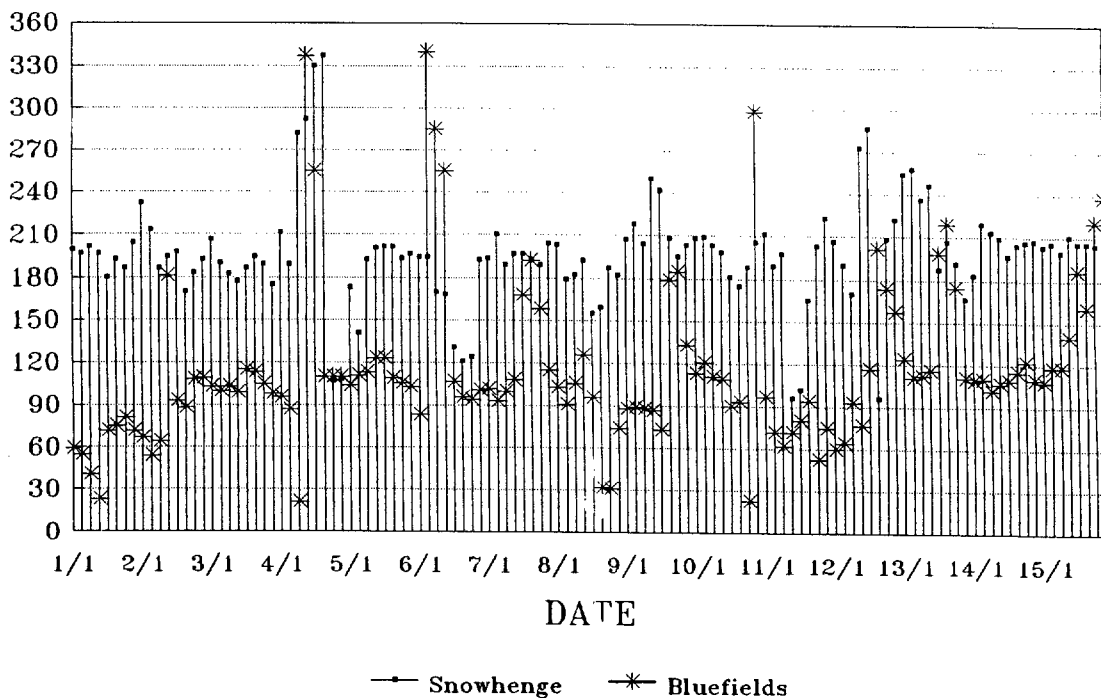
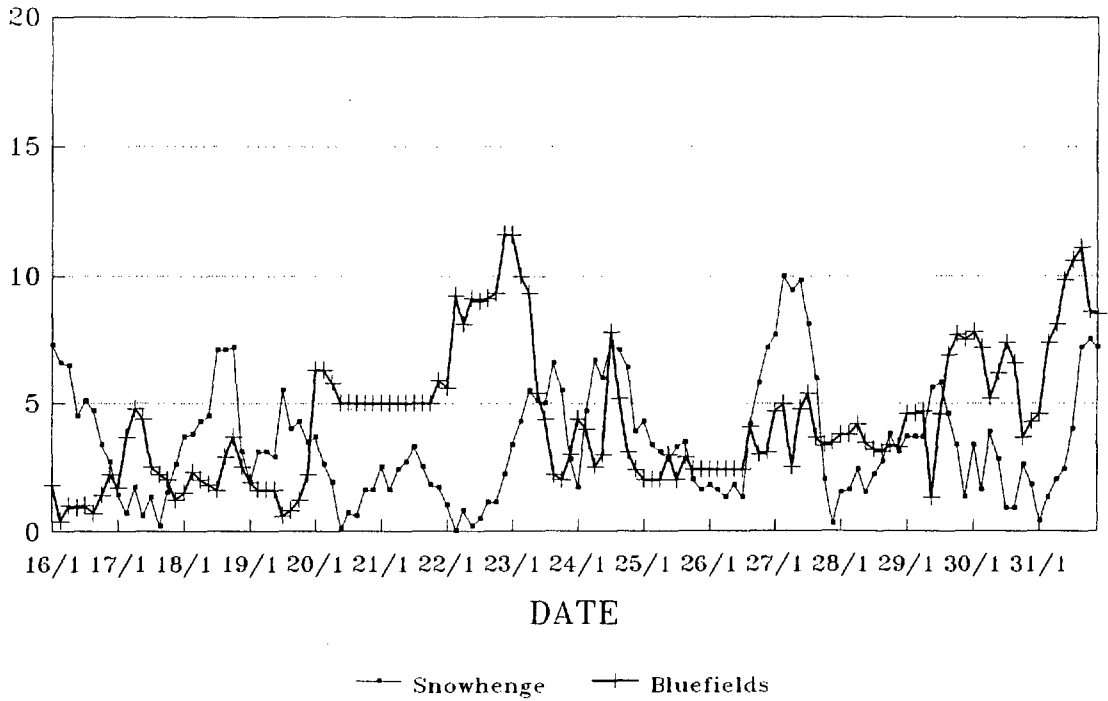


Figure 27. Time series of wind speed and direction January 1 - 15 1993.

16.-31. JANUARY 1993

WIND SPEED, M/S



16.-31. JANUARY 1993

WIND DIRECTION, DEGREES

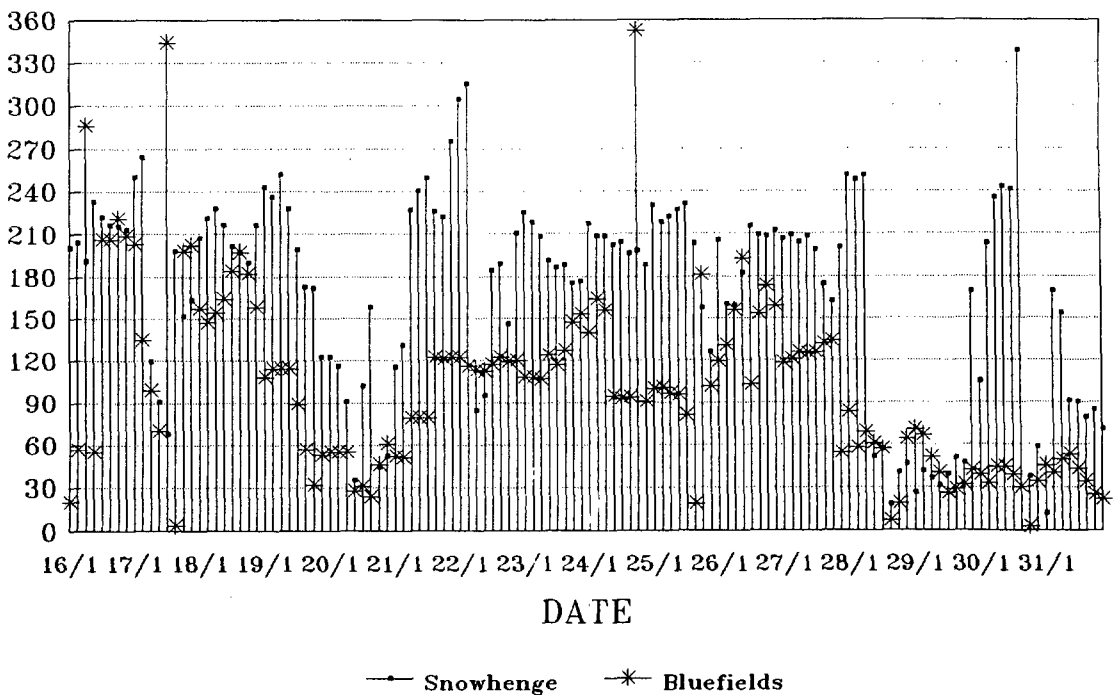
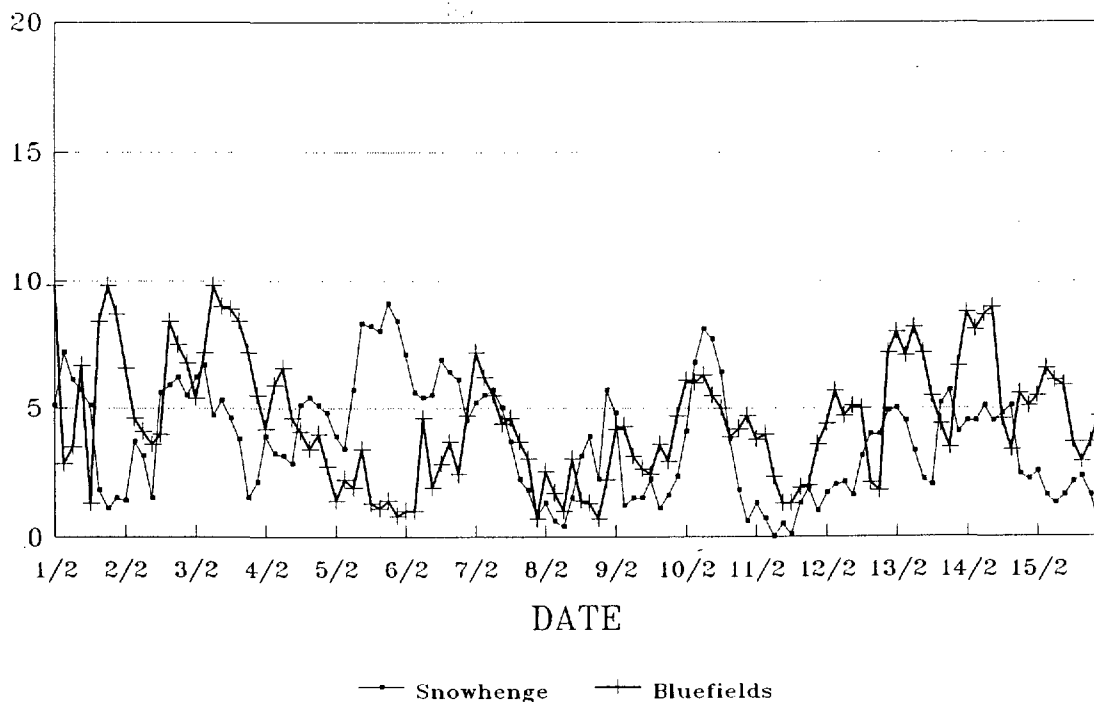


Figure 28. Time series of wind speed and direction January 16 - 31 1993.

1.-15. FEBRUARY 1993

WIND SPEED, M/S



1.-15. FEBRUARY 1993

WIND DIRECTION, DEGREES

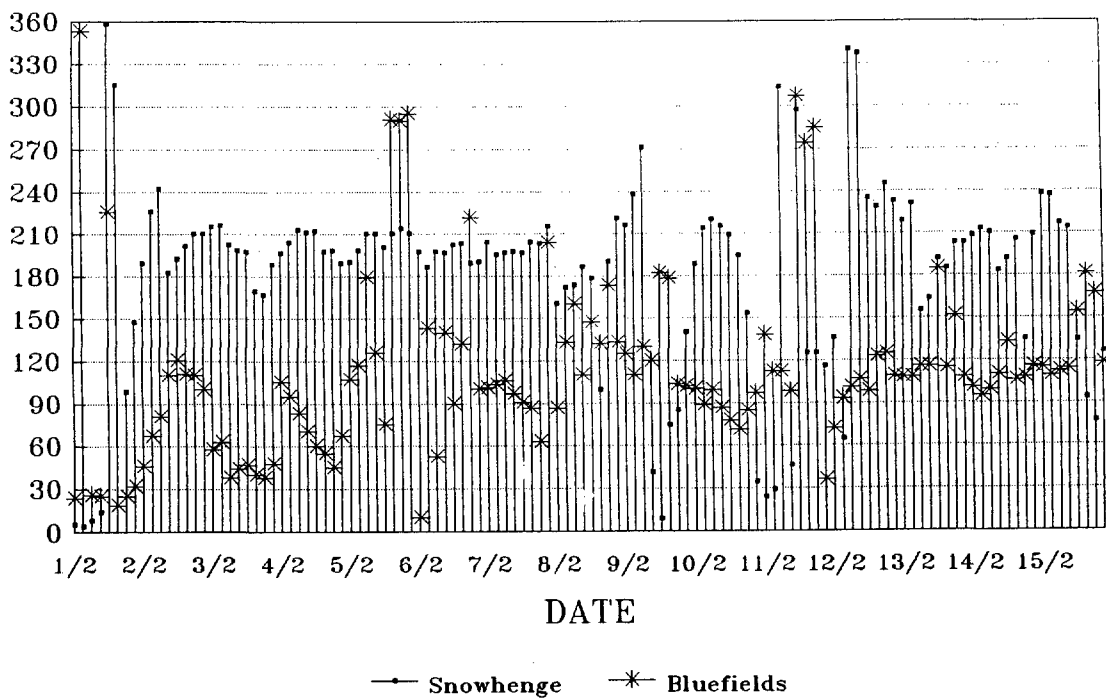
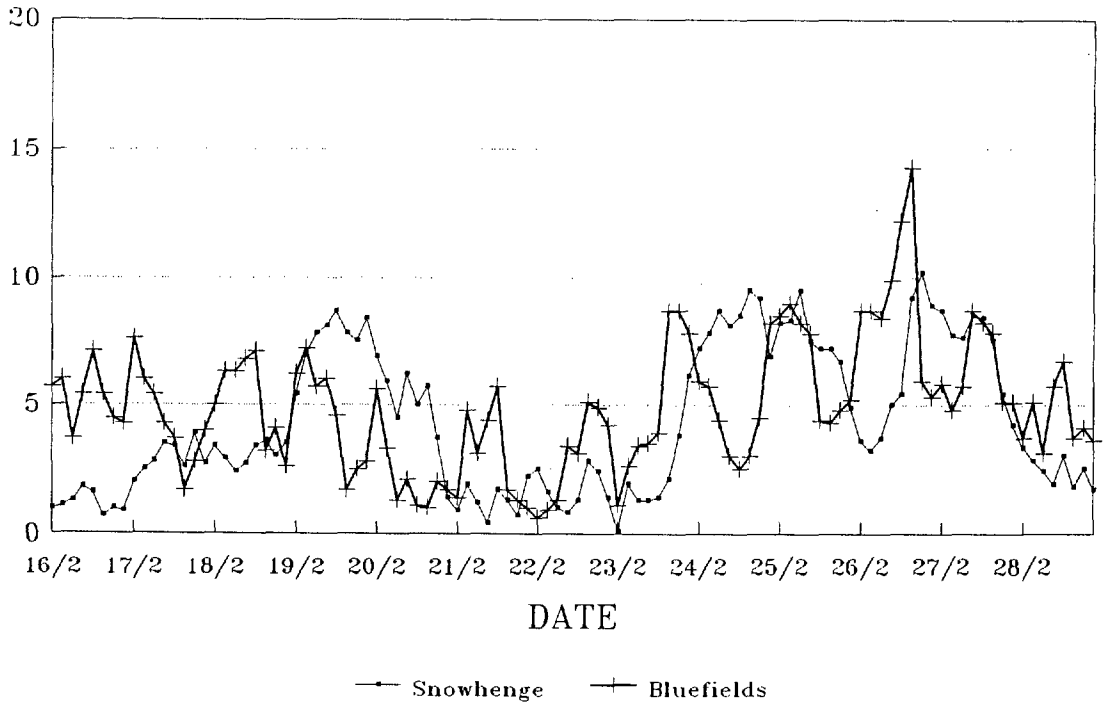


Figure 29. Time series of wind speed and direction February 1 - 15 1993.

16.-28. FEBRUARY 1993
WIND SPEED, M/S



16.-28. FEBRUARY 1993
WIND DIRECTION, DEGREES

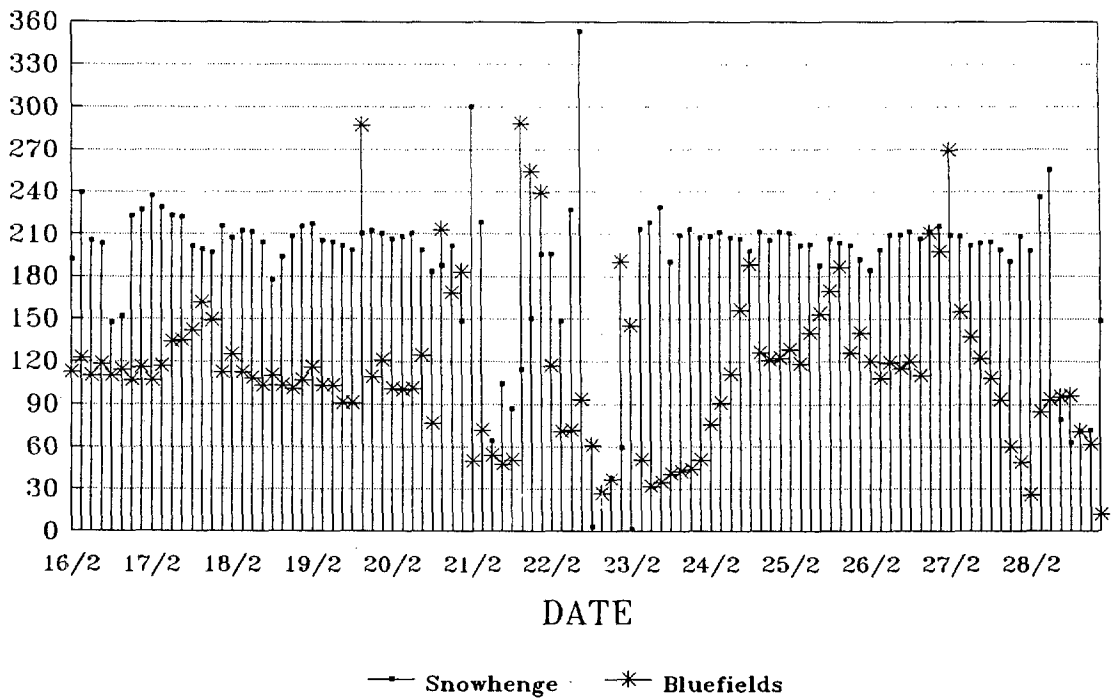
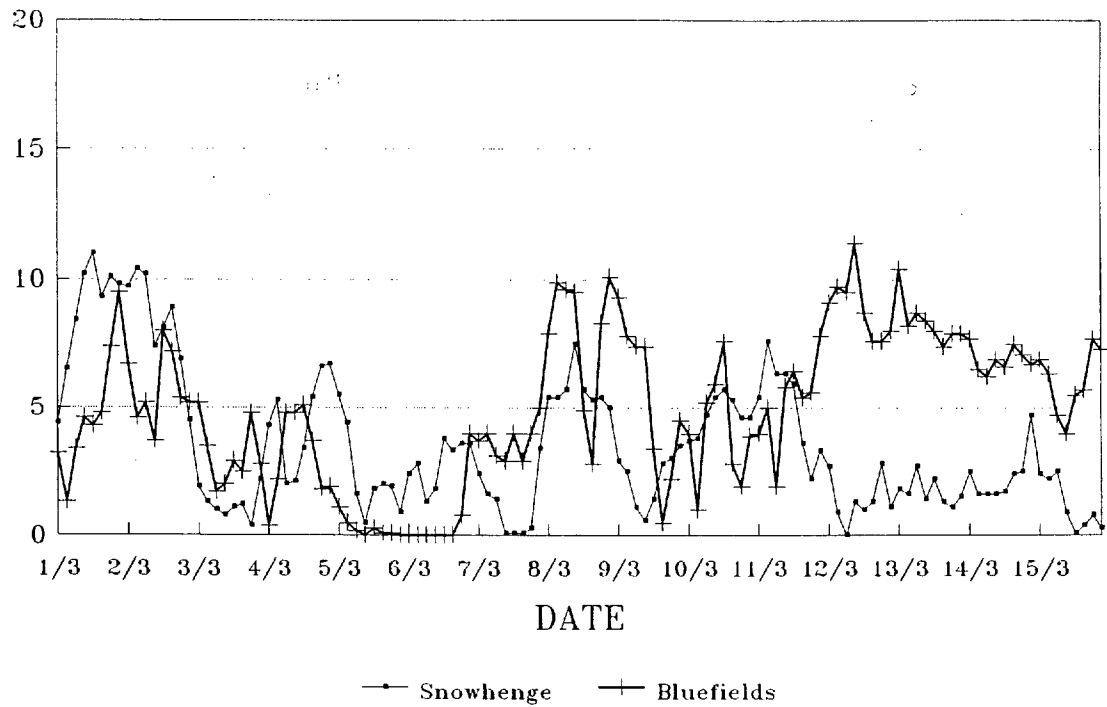


Figure 30. Time series of wind speed and direction February 16 - 28 1993.

1.-15. MARCH 1993

WIND SPEED, M/S



1.-15. MARCH 1993

WIND DIRECTION, DEGREES

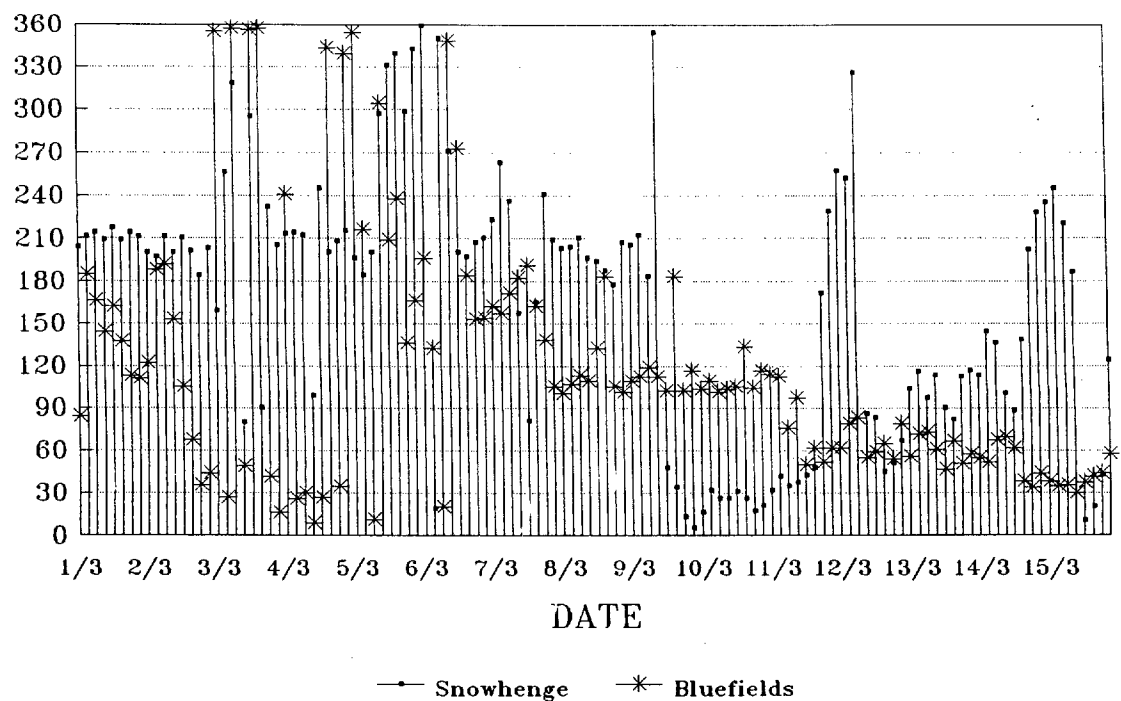
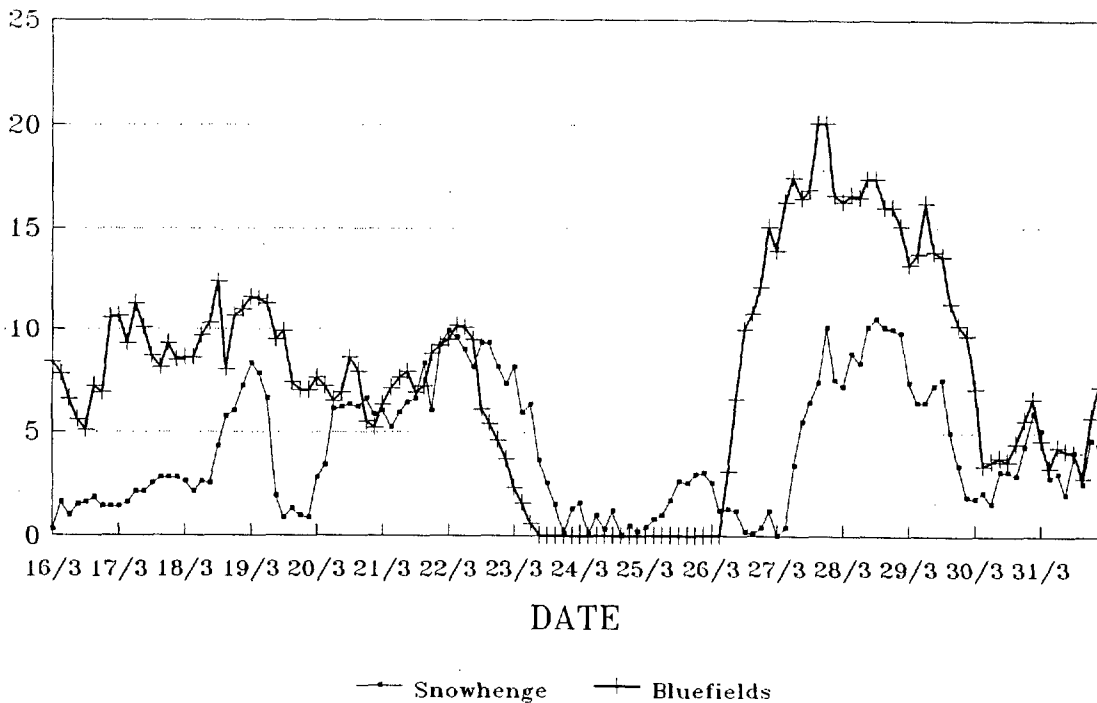


Figure 31. Time series of wind speed and direction March 1 - 15 1993.

16.-31. MARCH 1993 WIND SPEED, M/S



16.-31. MARCH 1993 WIND DIRECTION, DEGREES

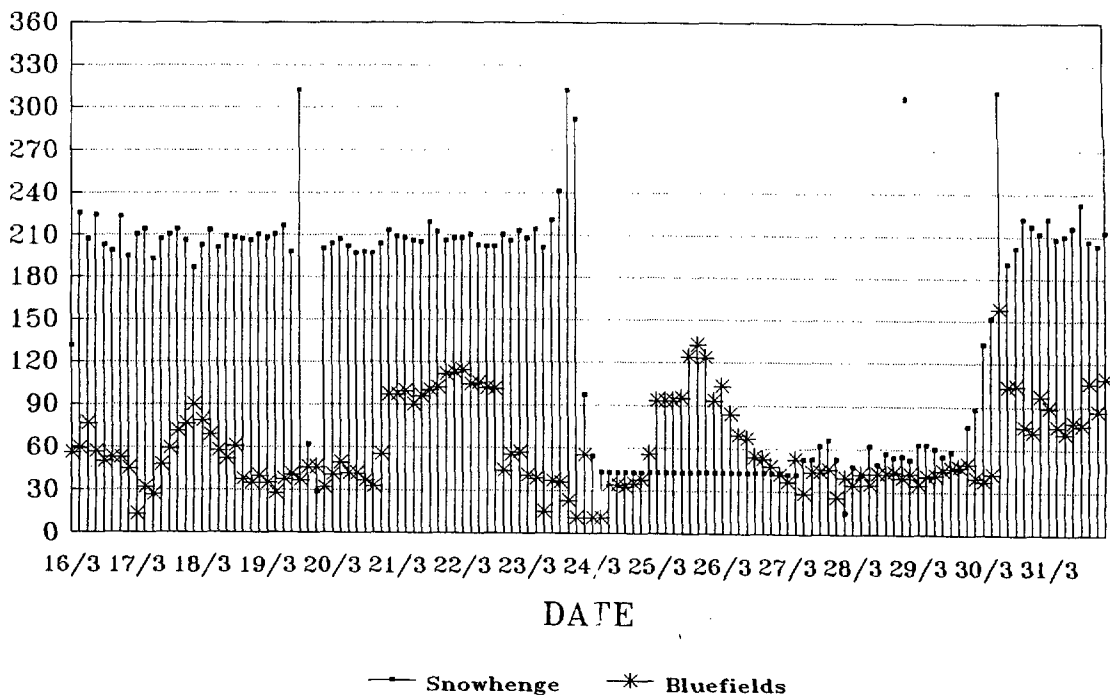
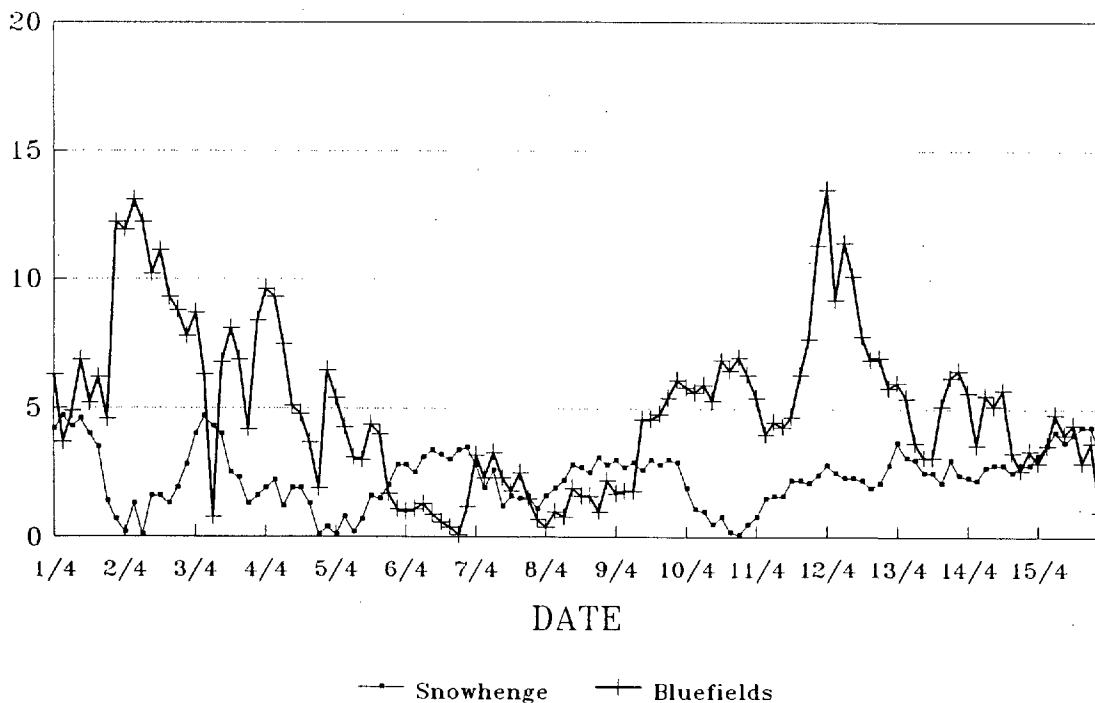


Figure 32. Time series of wind speed and direction March 16 - 31 1993.

1.-15. APRIL 1993

WIND SPEED, M/S



1.-15. APRIL 1993

WIND DIRECTION, DEGREES

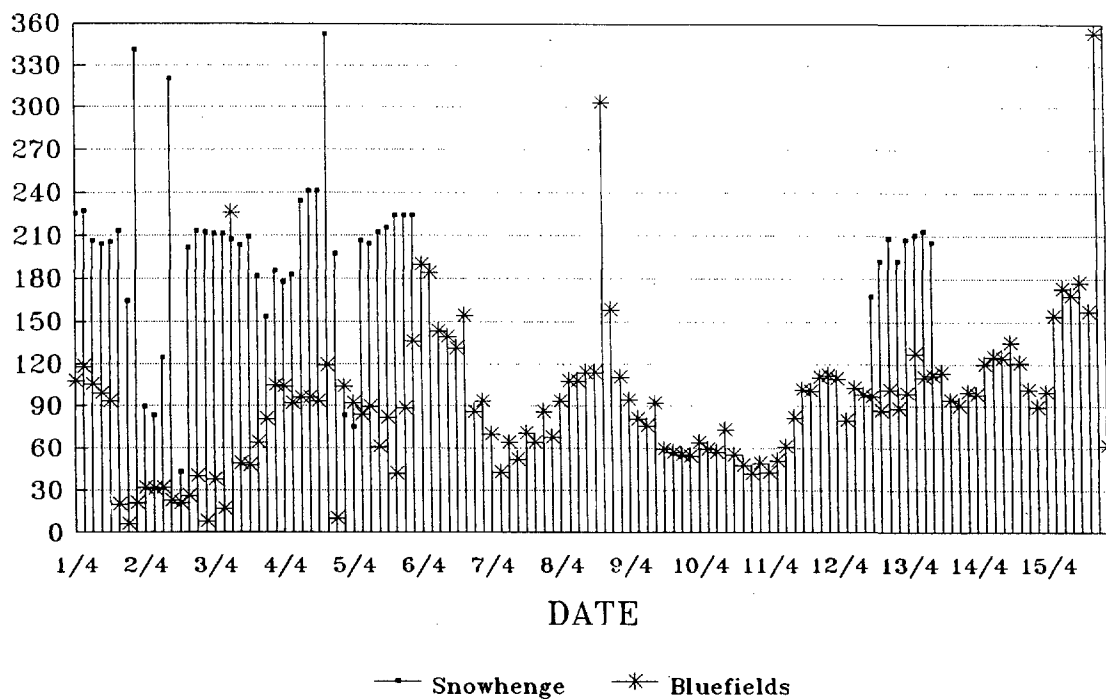
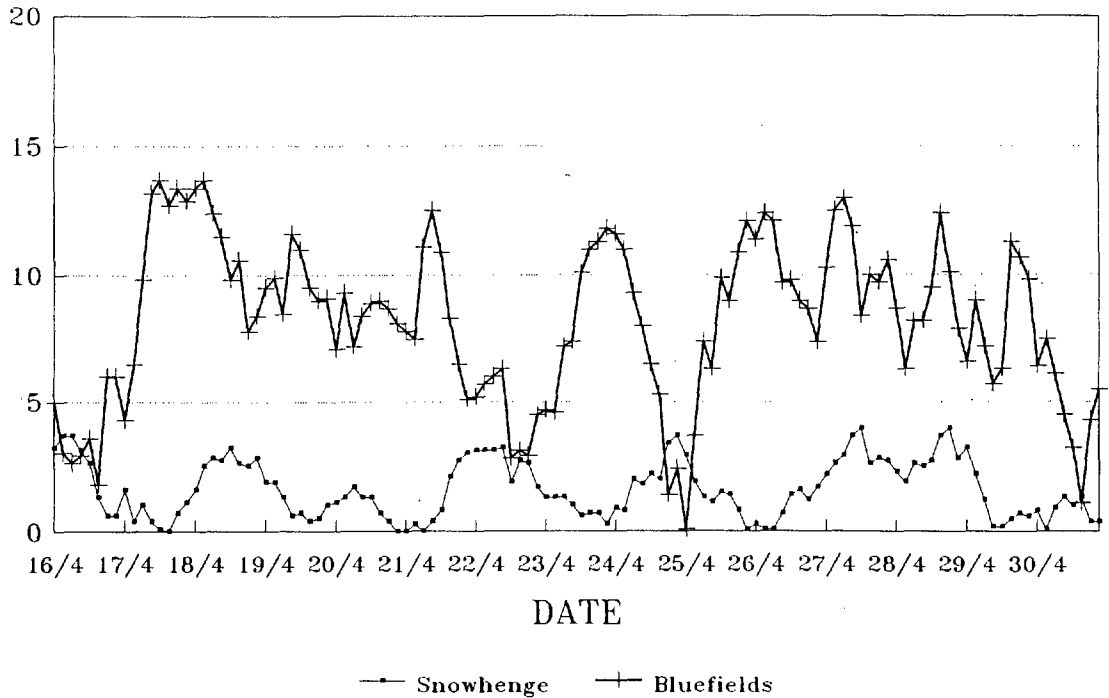


Figure 33. Time series of wind speed and direction April 1 - 15 1993.

16.-30. APRIL 1993

WIND SPEED, M/S



16.-30. APRIL 1993

WIND DIRECTION, M/S

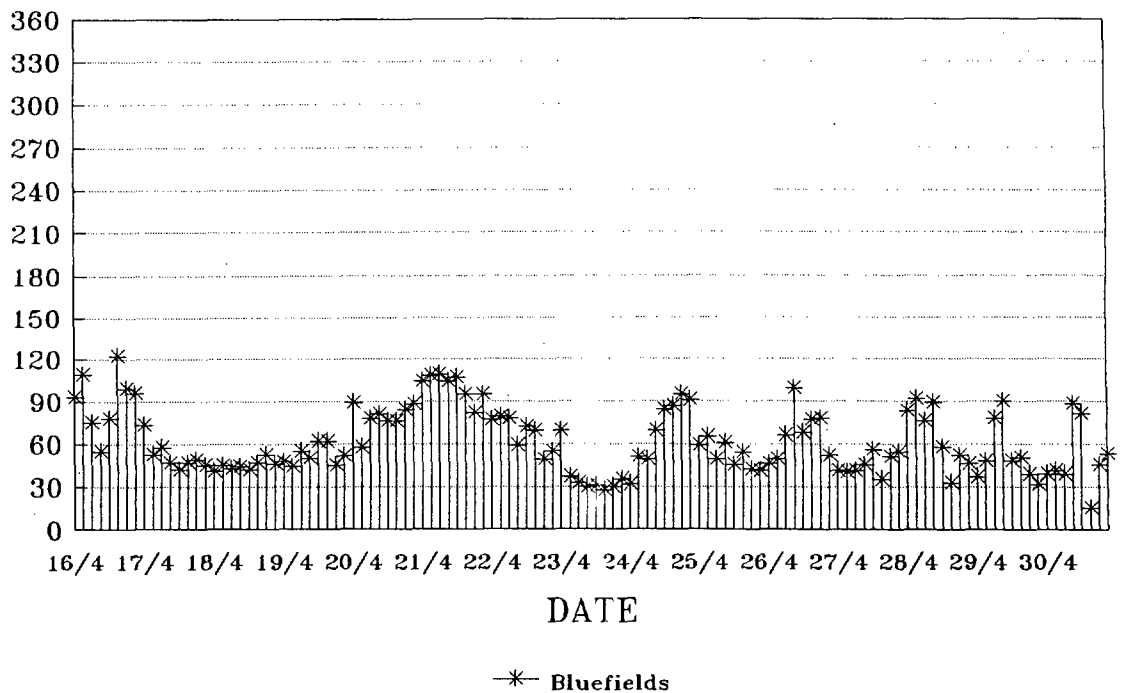
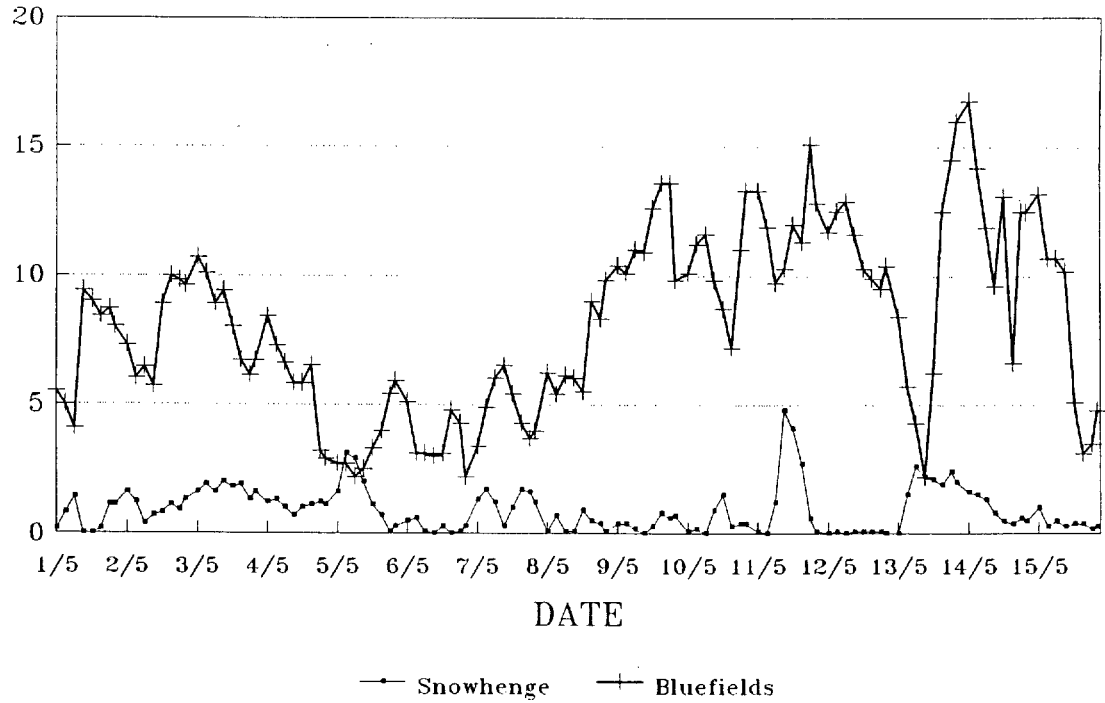


Figure 34. Time series of wind speed and direction April 16 - 30 1993.

1.-15. MAY 1993
WIND SPEED, M/S



1.-15. MAY 1993
WIND DIRECTION, DEGREES

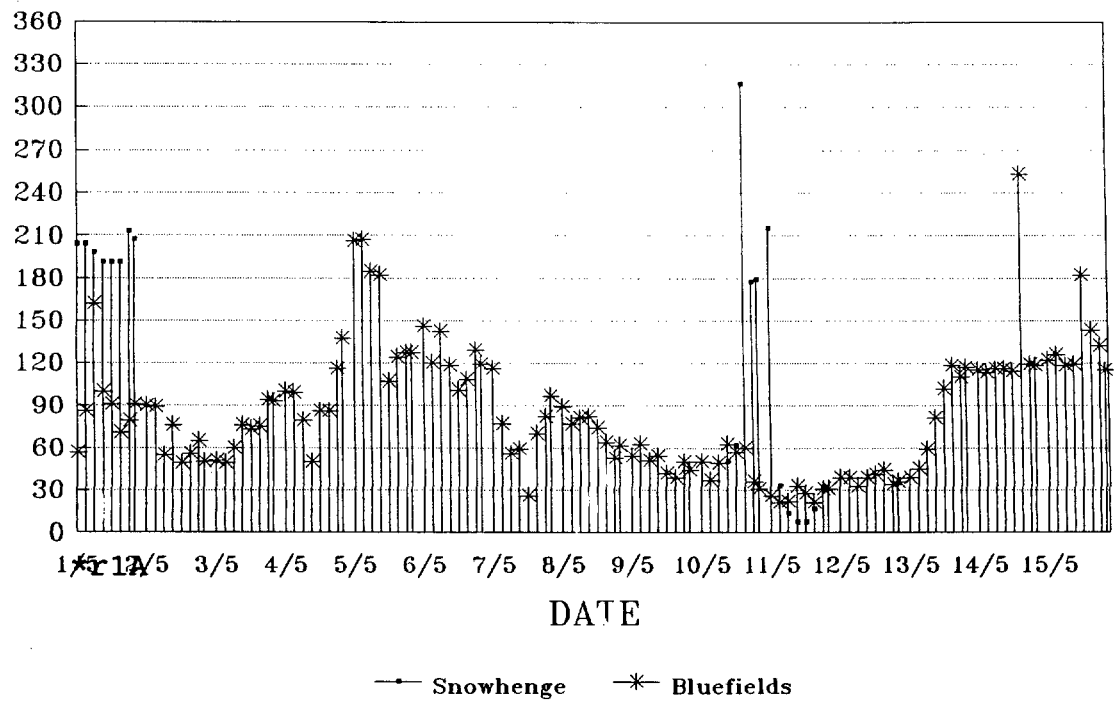
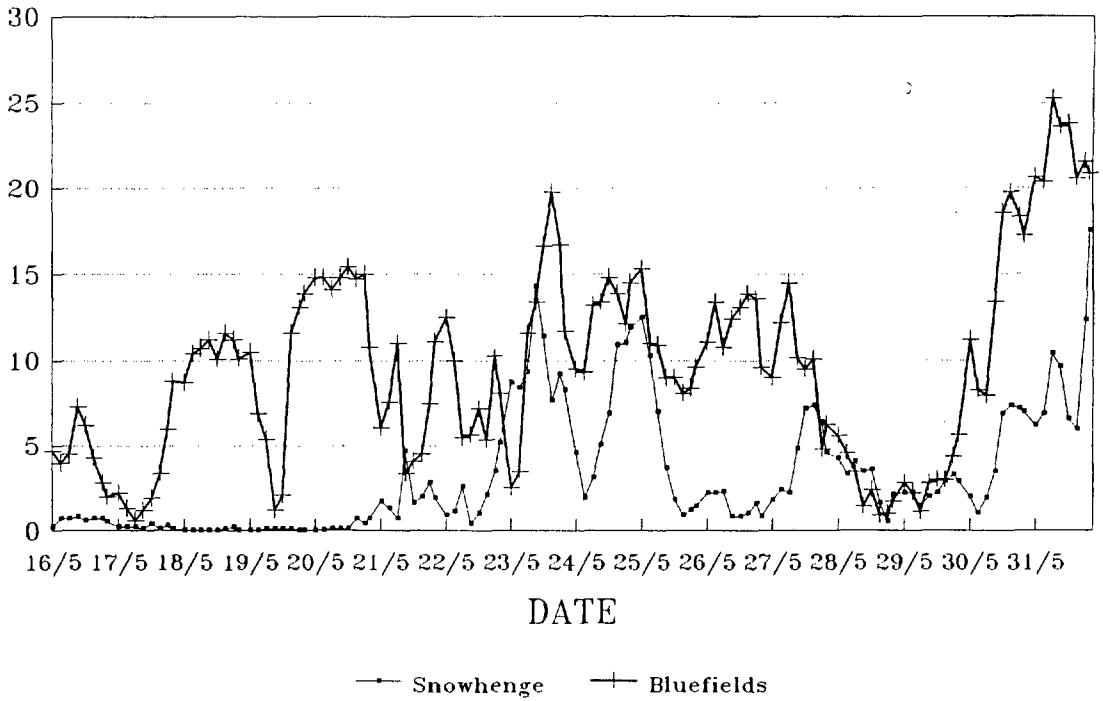


Figure 35. Time series of wind speed and direction May 1 - 15 1993.

16.-31. MAY 1993
WIND SPEED, M/S



16.-31. MAY 1993
WIND DIRECTION, DEGREES

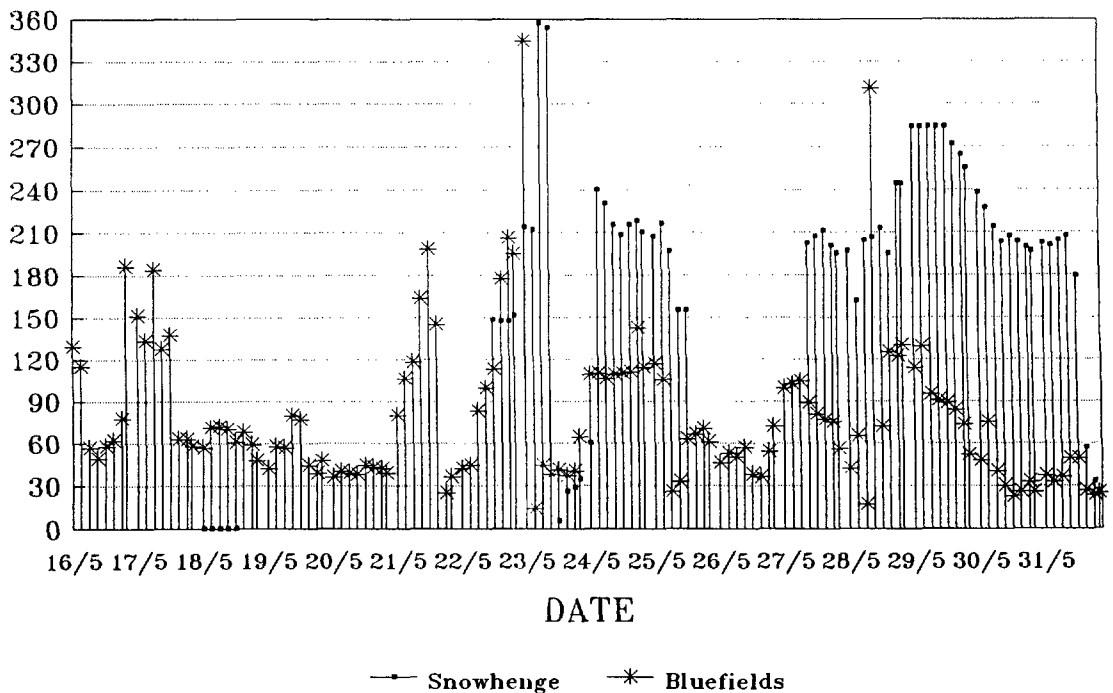
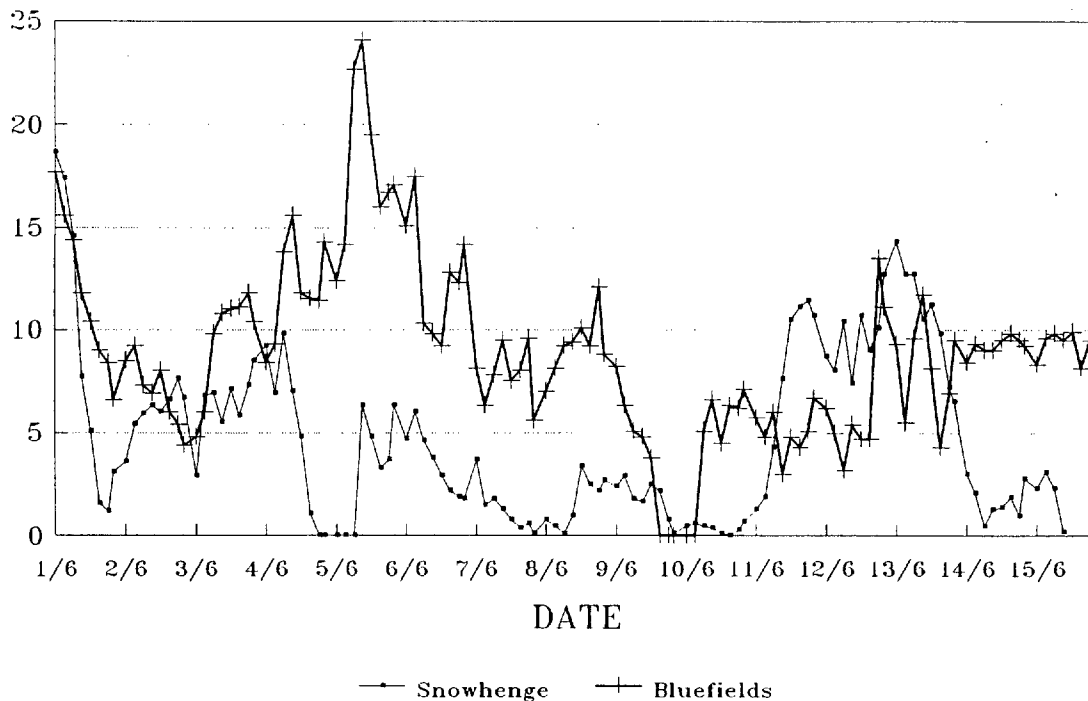


Figure 36. Time series of wind speed and direction May 16 - 31 1993.

1.-15. JUNE 1993

WIND SPEED, M/S



1.-15. JUNE 1993

WIND DIRECTION, DEGREES

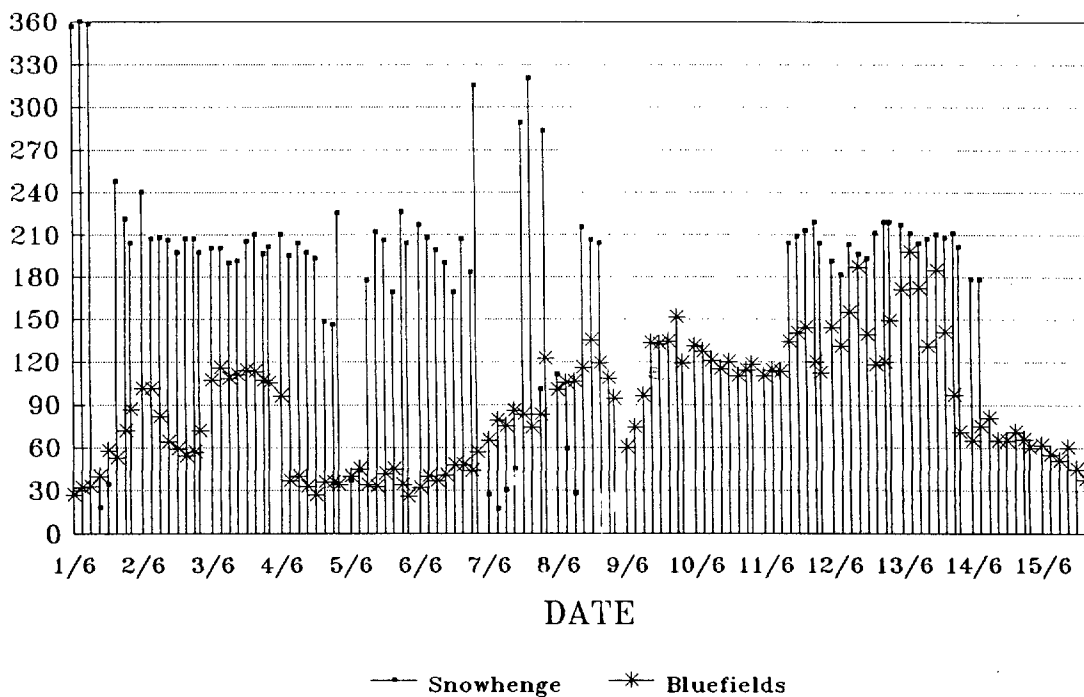
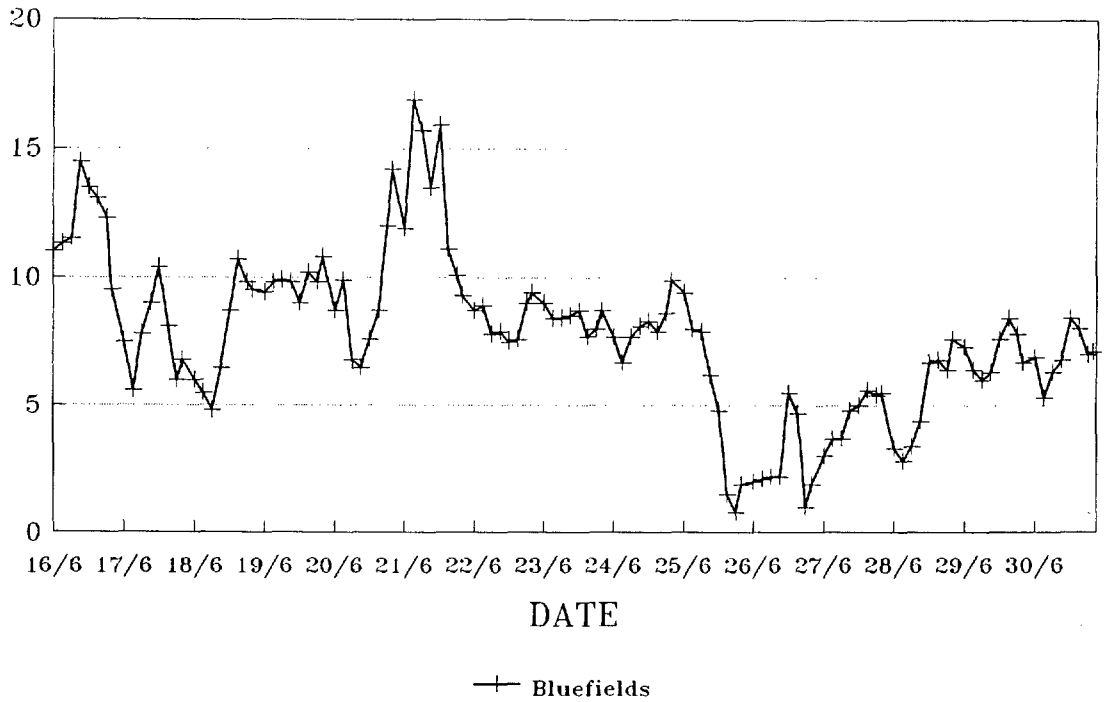


Figure 37. Time series of wind speed and direction June 1 - 15 1993.

16.-30. JUNE 1993

WIND SPEED, M/S



16.-30. JUNE 1993

WIND DIRECTION, DEGREES

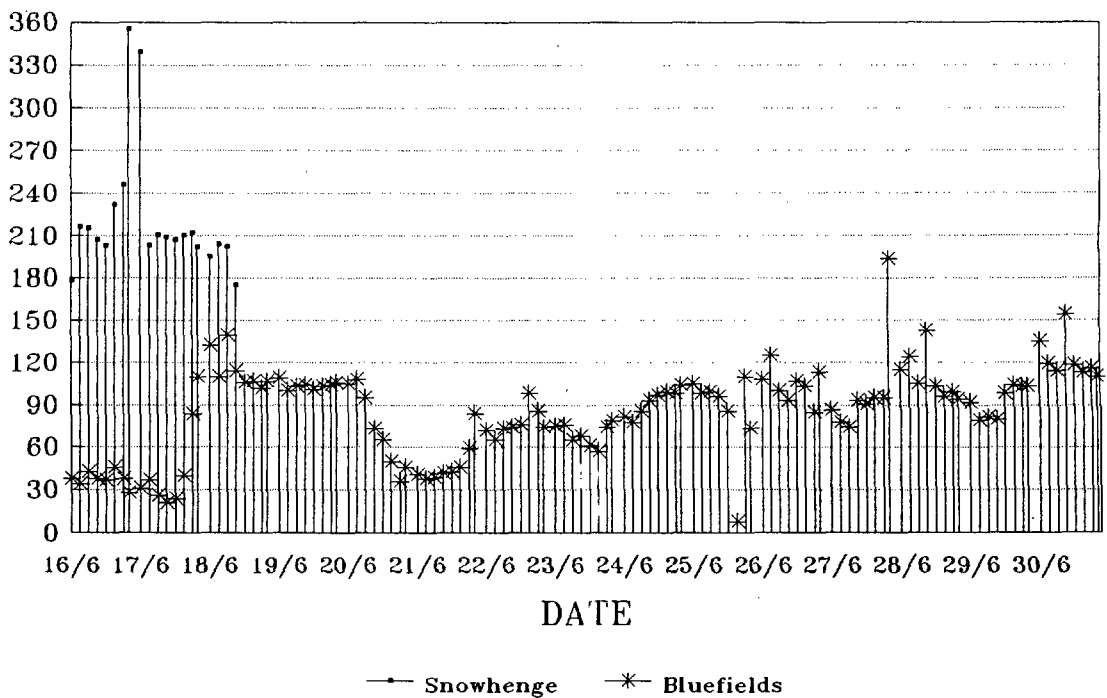
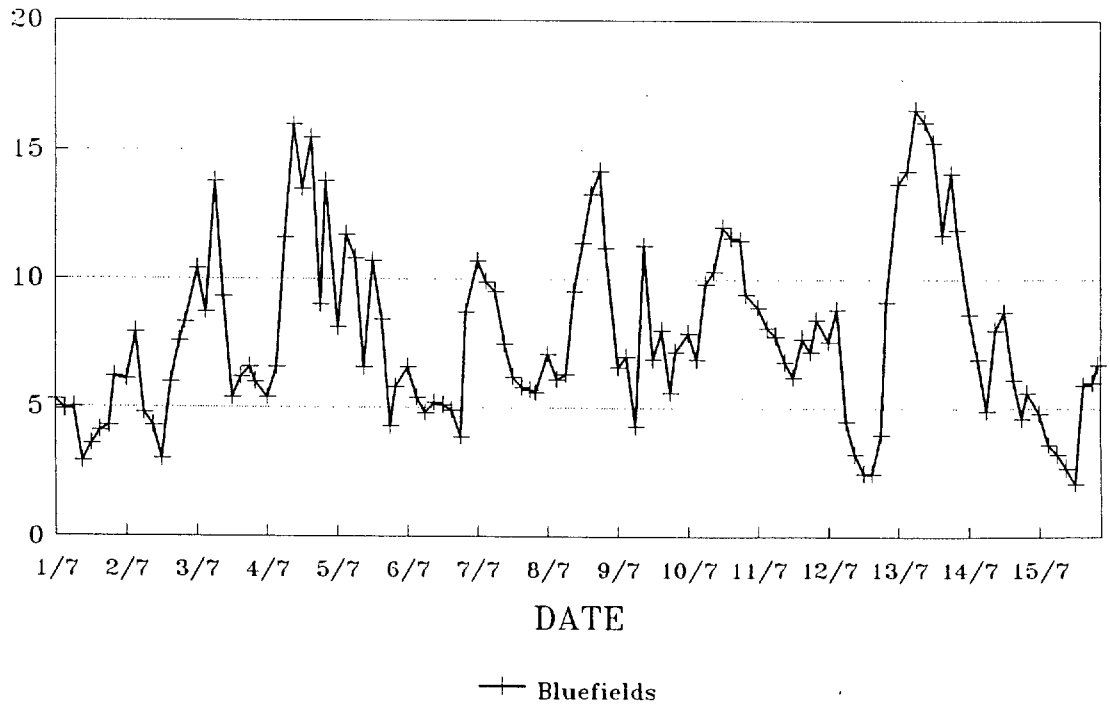


Figure 38. Time series of wind speed and direction June 16 - 31 1993.

1.-15. JULY 1993

WIND SPEED, M/S



1.-15. JULY 1993

WIND DIRECTION, DEGREES

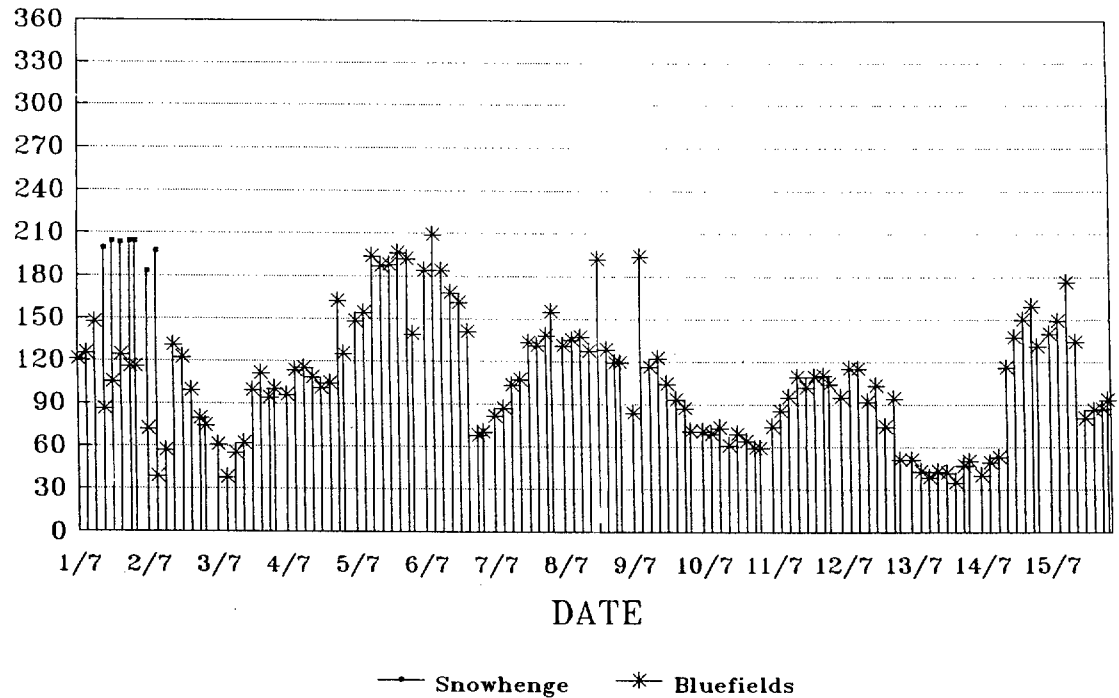
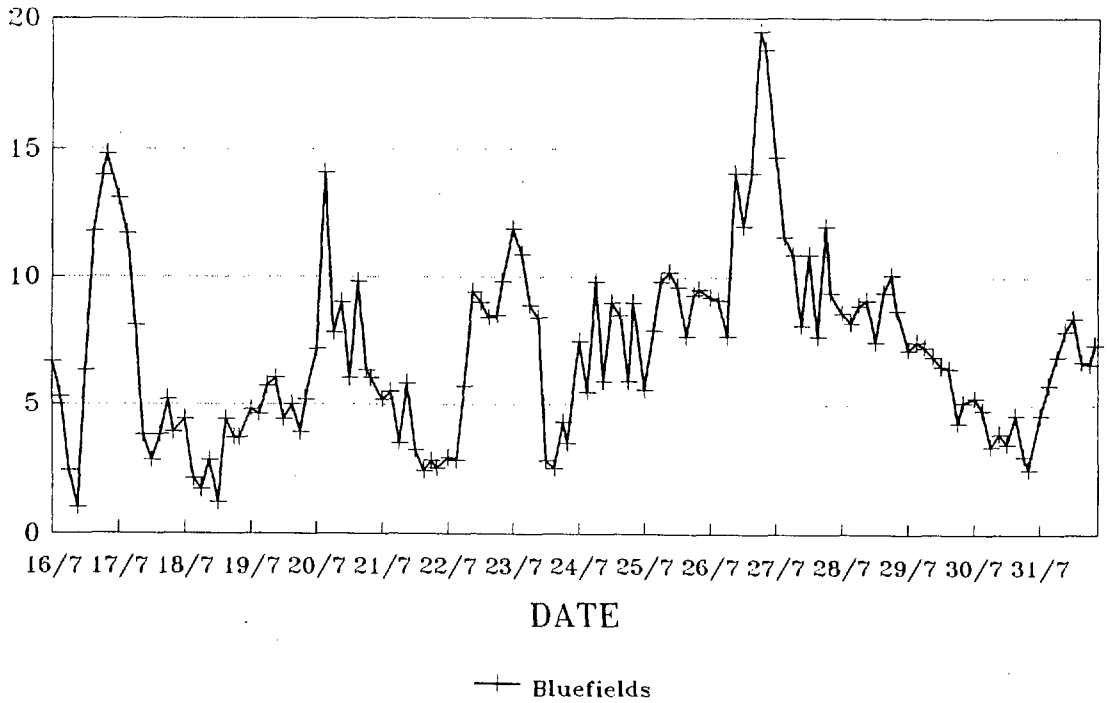


Figure 39. Time series of wind speed and direction July 1 - 15 1993.

16.-31. JULY 1993

WIND SPEED, M/S



16.-31. JULY 1993

WIND DIRECTION, DEGREES

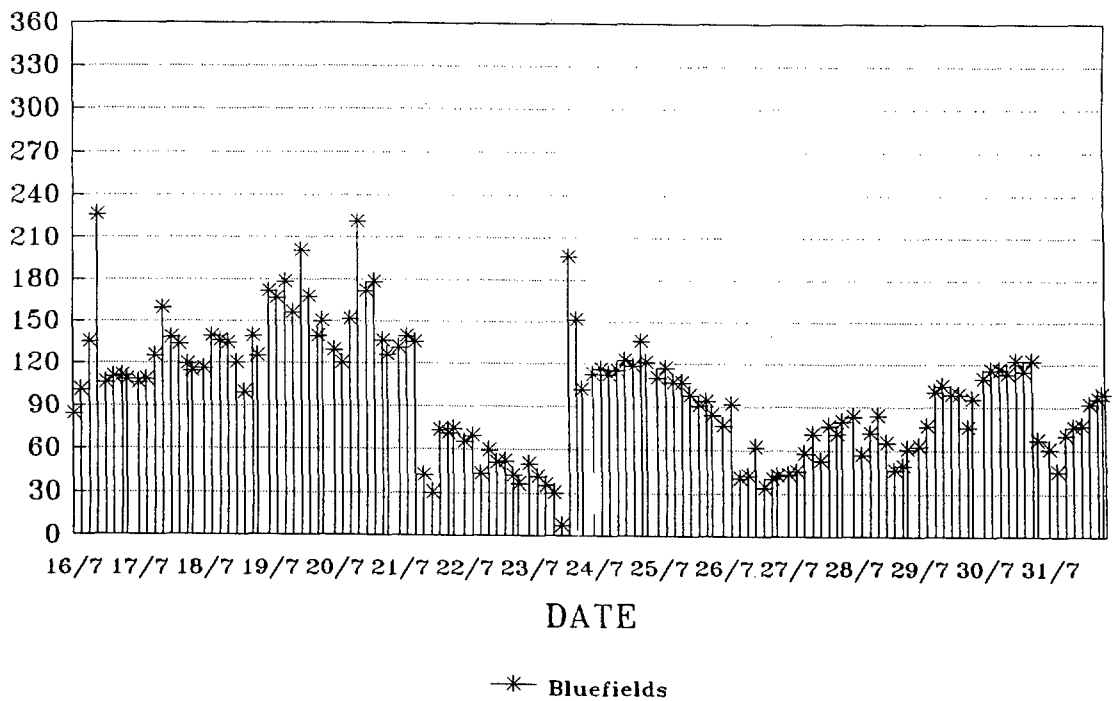
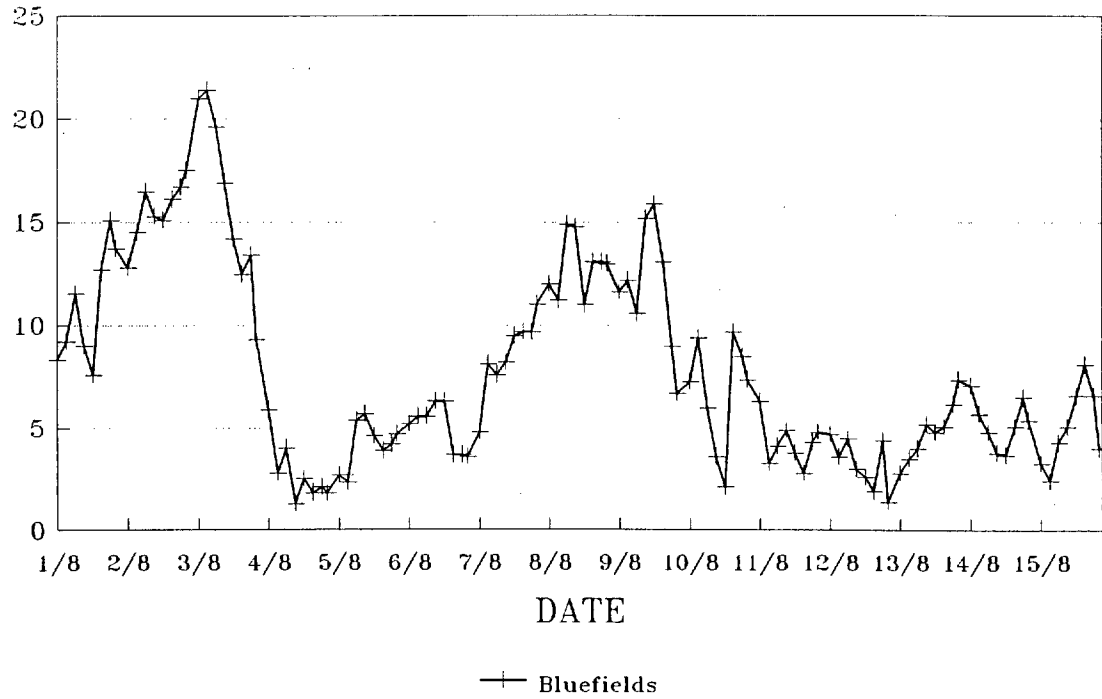


Figure 40. Time series of wind speed and direction July 16 - 31 1993.

1.-15. AUGUST 1993

WIND SPEED, M/S



1.-15. AUGUST 1993

WIND DIRECTION, DEGREES

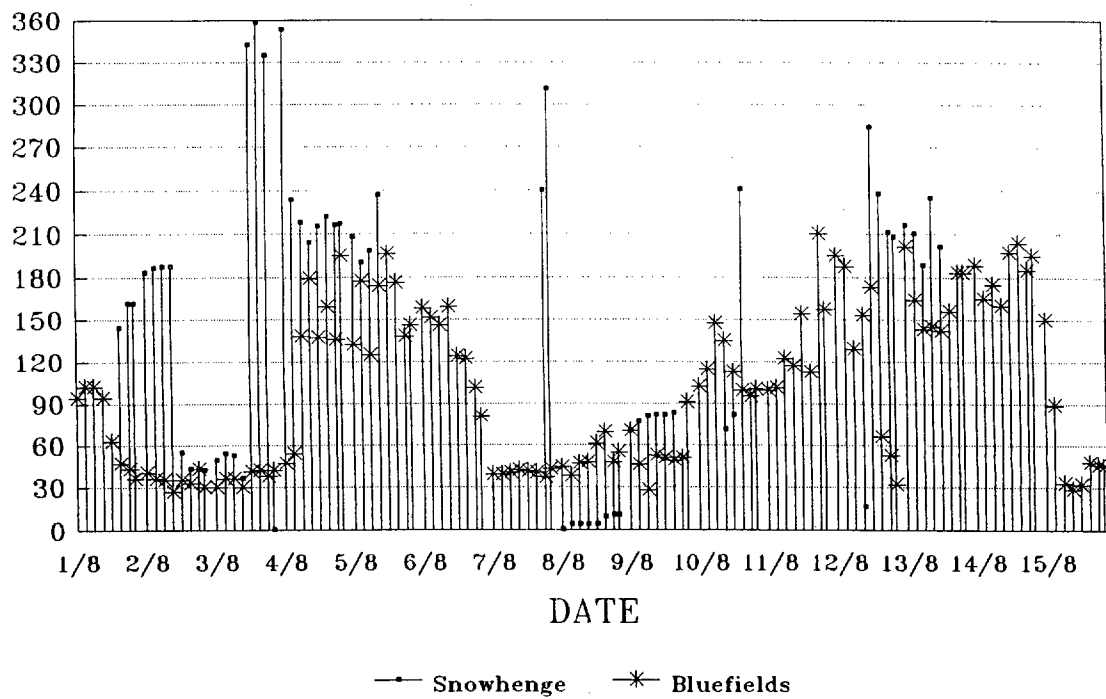
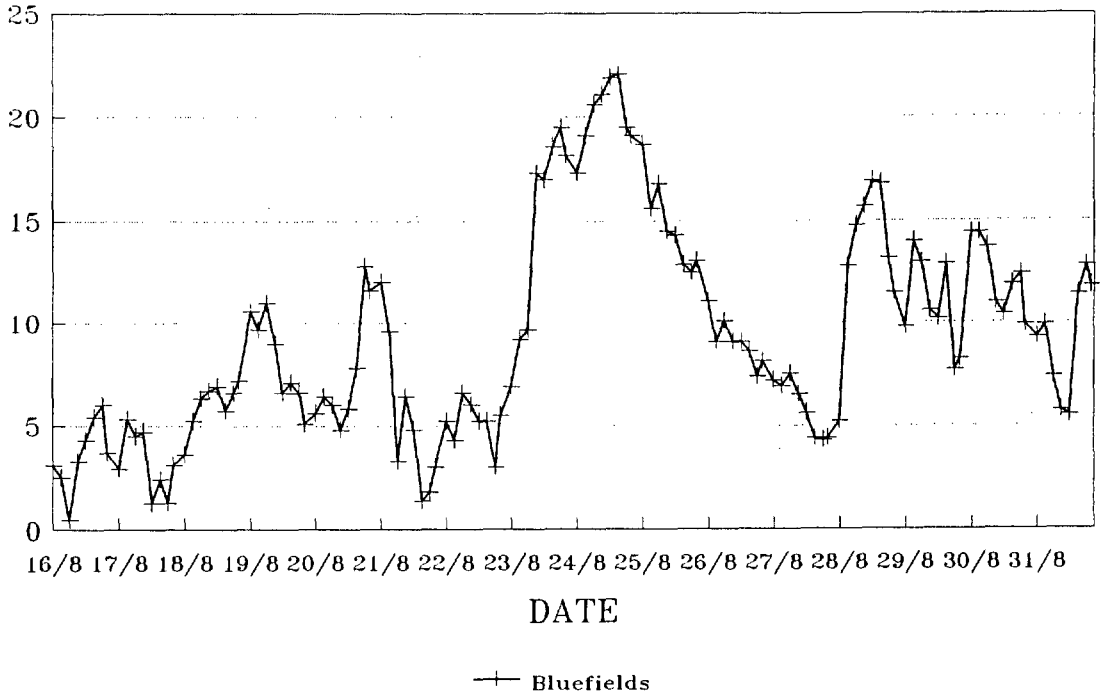


Figure 41. Time series of wind speed and direction August 1 - 15 1993.

16.-31. AUGUST 1993

WIND SPEED. M/S



16.-31. AUGUST 1993

WIND DIRECTION, DEGREES

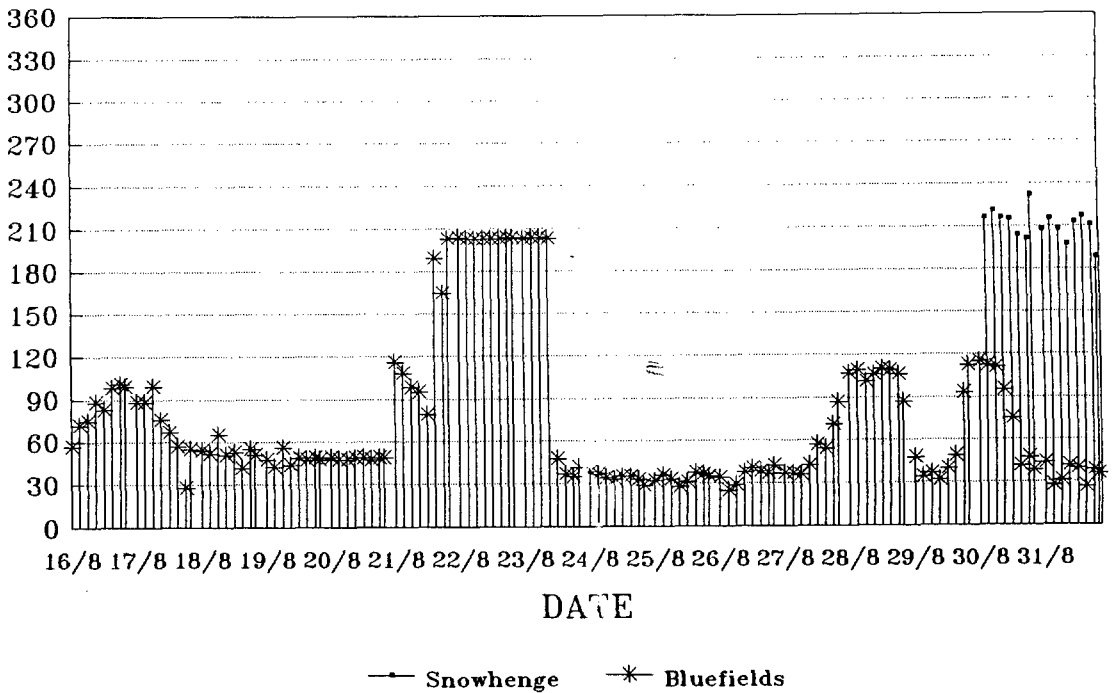
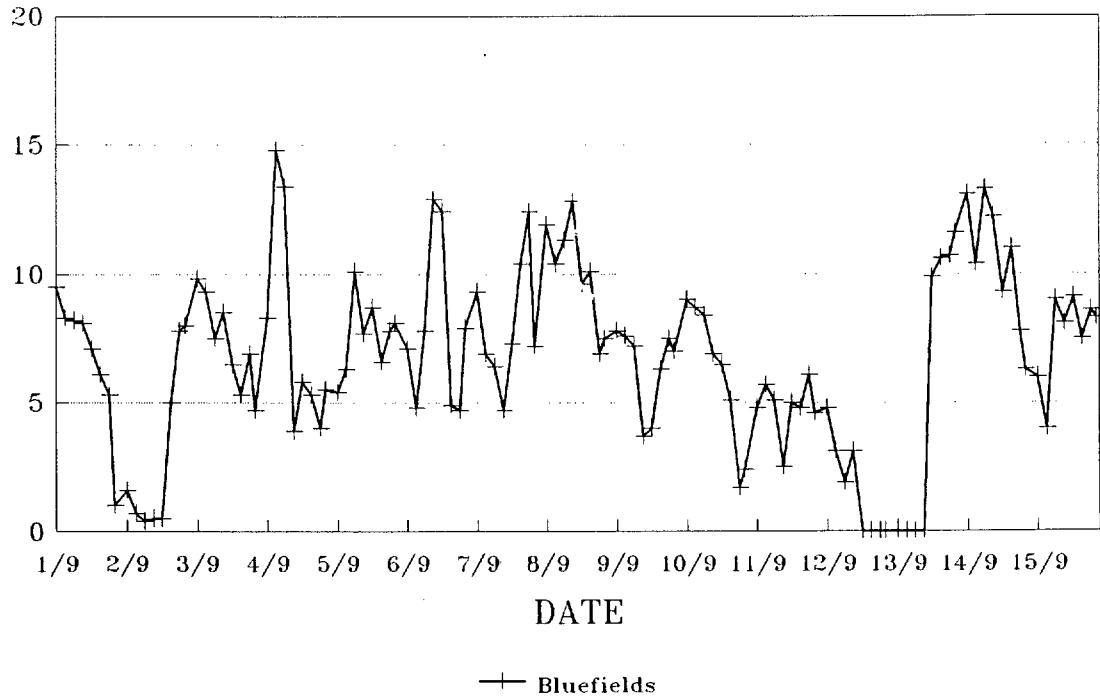


Figure 42. Time series of wind speed and direction August 16 - 31 1993.

1.-15. SEPTEMBER 1993

WIND SPEED, M/S



1.-15. SEPTEMBER 1993

WIND DIRECTION, DEGREES

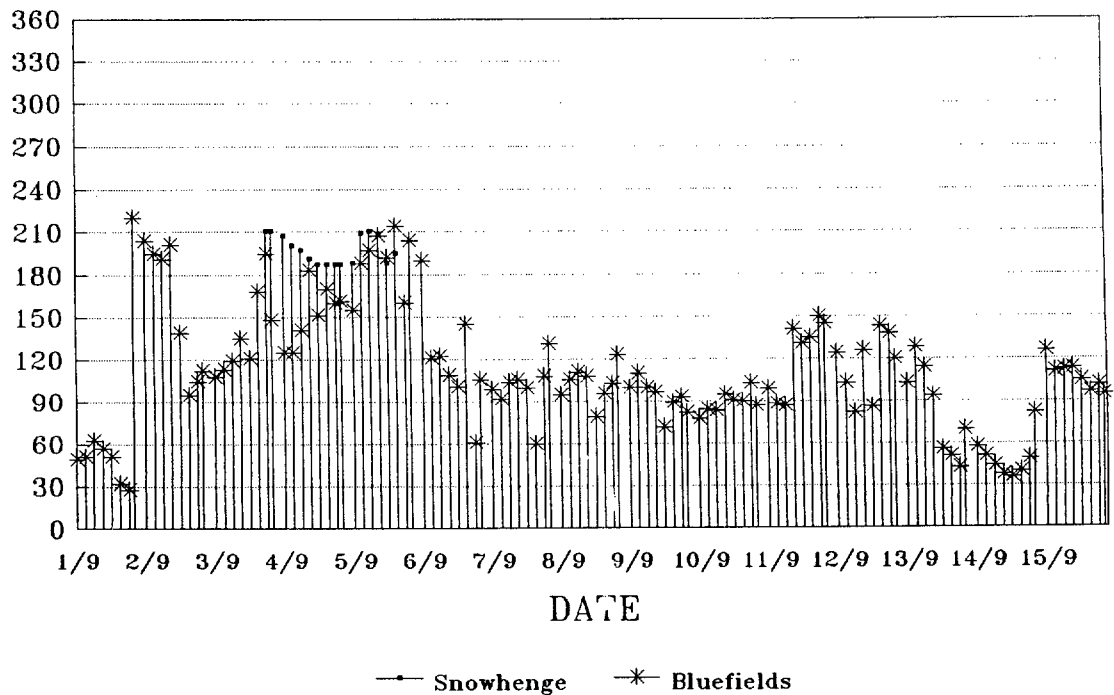
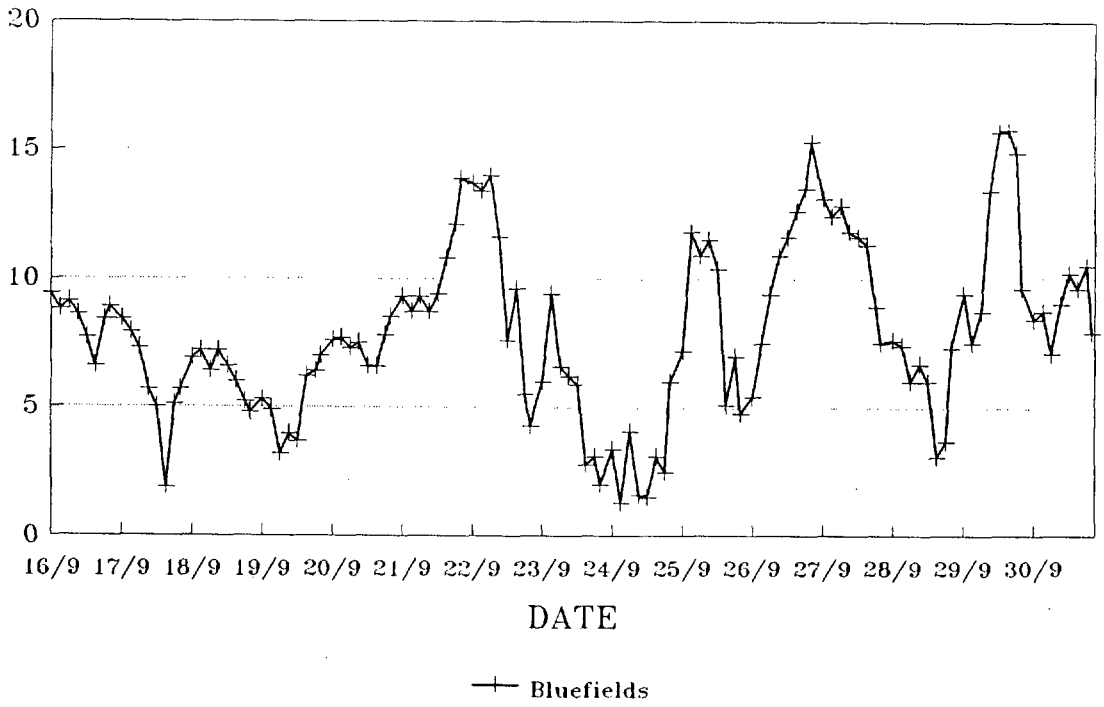


Figure 43. Time series of wind speed and direction September 1 - 15 1993.

16.-30. SEPTEMBER 1993

WIND SPEED, M/S



16.-30. SEPTEMBER 1993

WIND DIRECTION, DEGREES

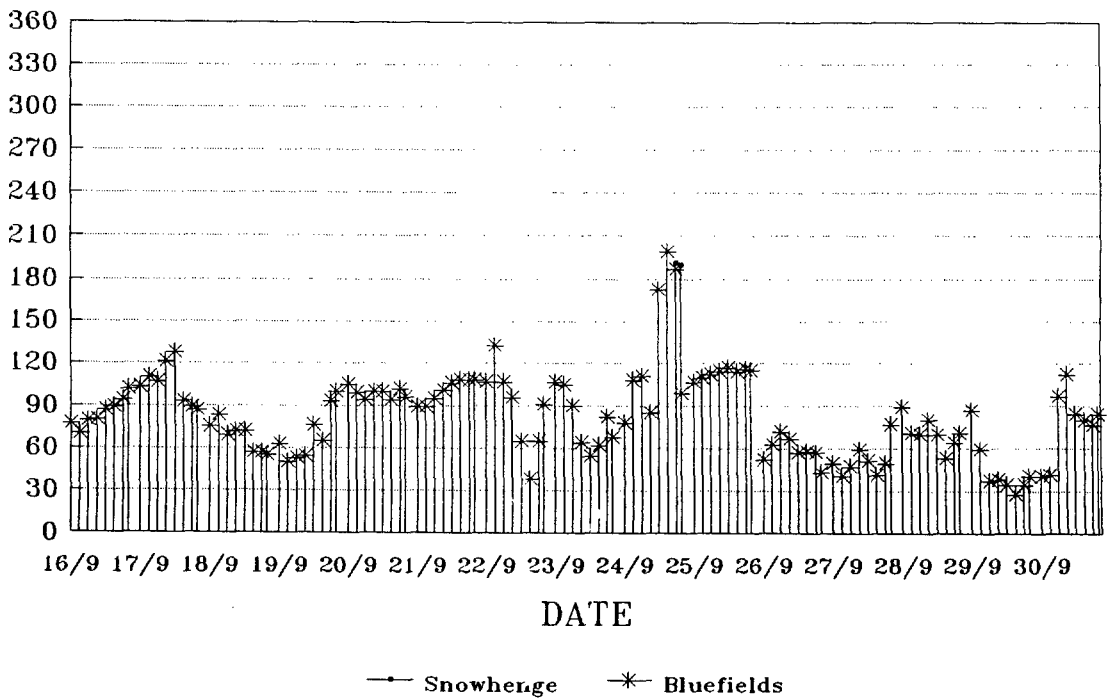
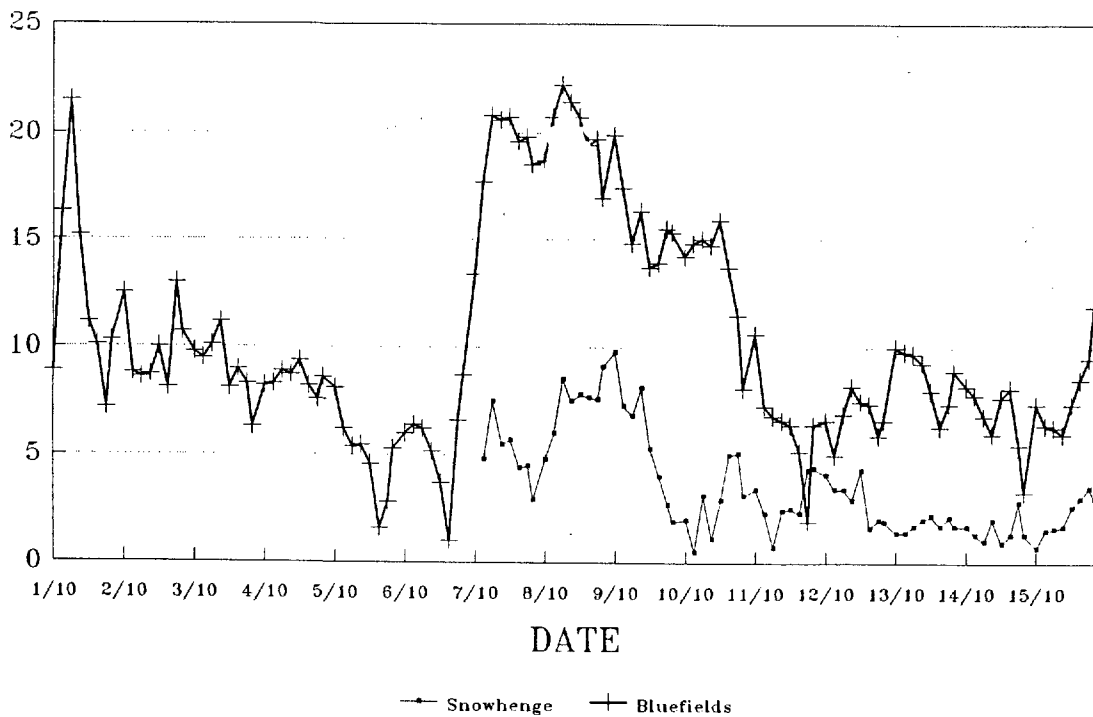


Figure 44. Time series of wind speed and direction September 16 - 30 1993.

1.-15. OCTOBER 1993

WIND SPEED, M/S



1.-15. OCTOBER 1993

WIND DIRECTION, DEGREES

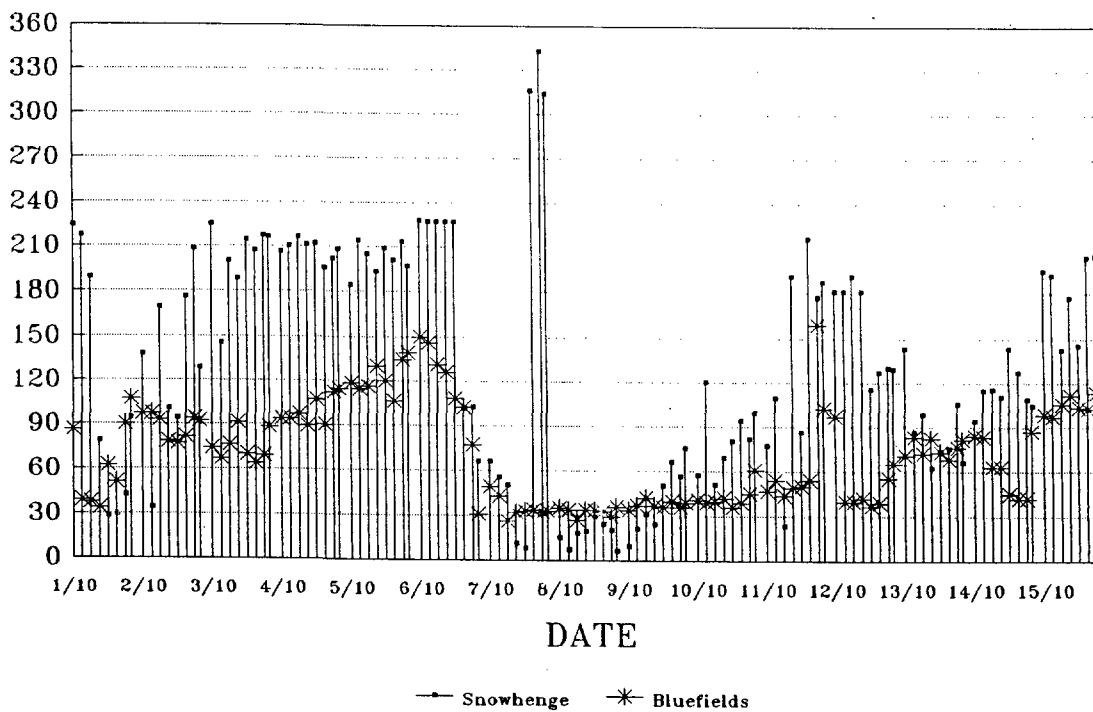
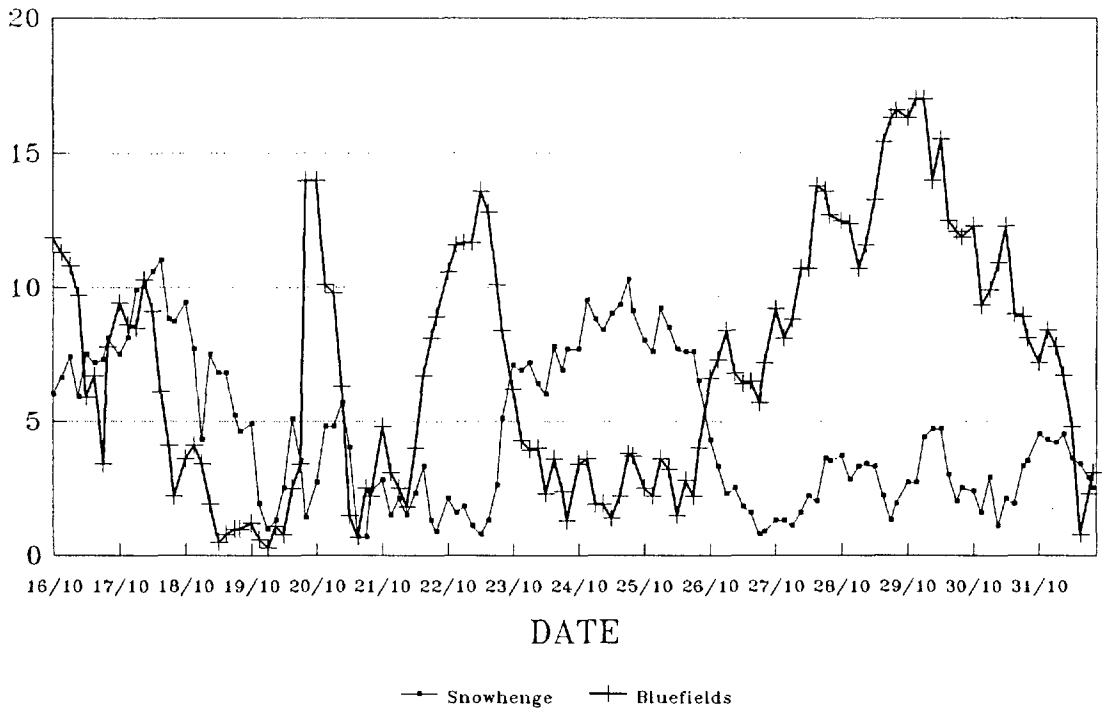


Figure 45. Time series of wind speed and direction October 1 - 16 1993.

16.-31. OCTOBER 1993

WIND SPEED, M/S



16.-31. OCTOBER 1993

WIND DIRECTION, DEGREES

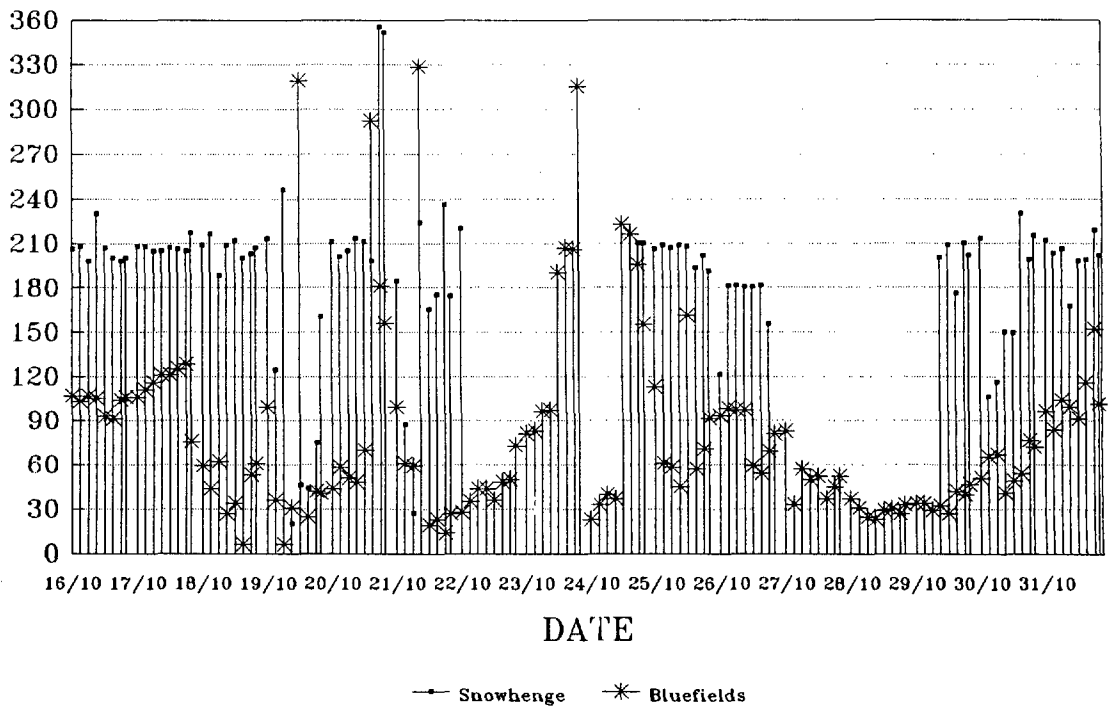
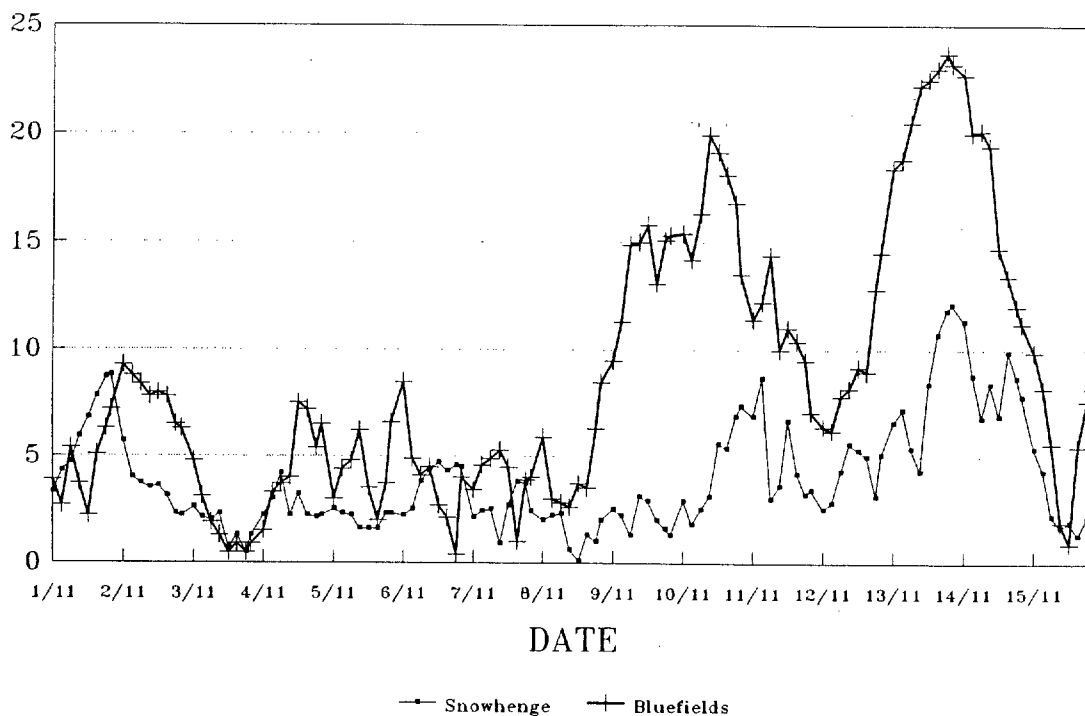


Figure 46. Time series of wind speed and direction October 16 - 31 1993.

1.-15. NOVEMBER 1993

WIND SPEED, M/S



1.-15. NOVEMBER 1993

WIND DIRECTION, DEGREES

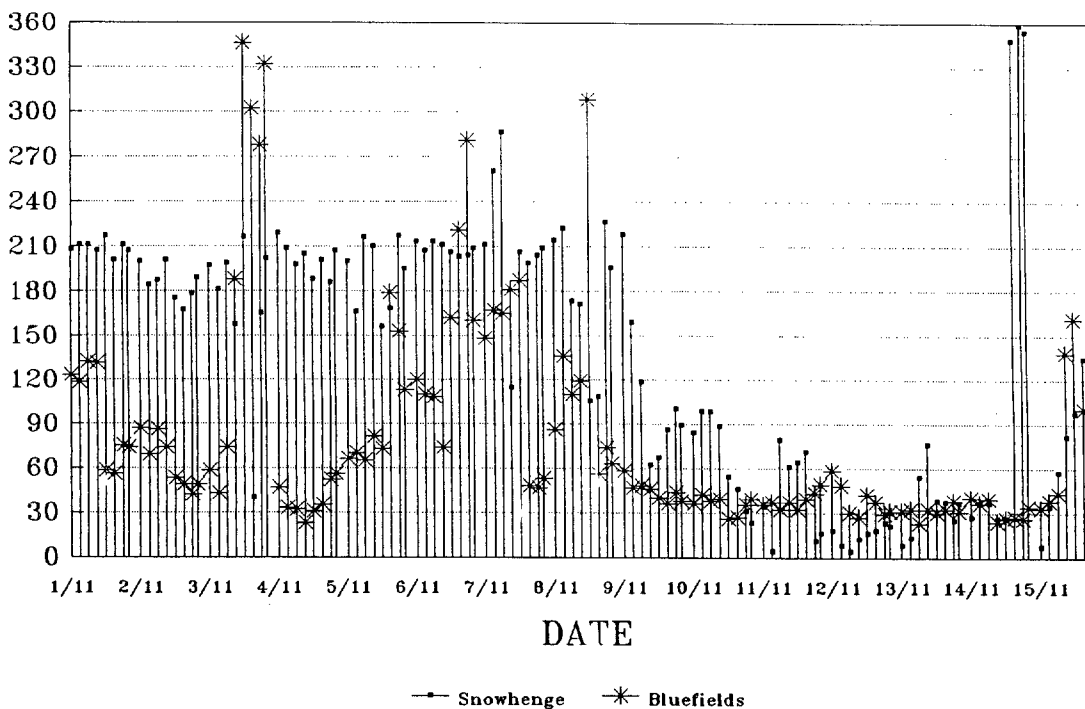
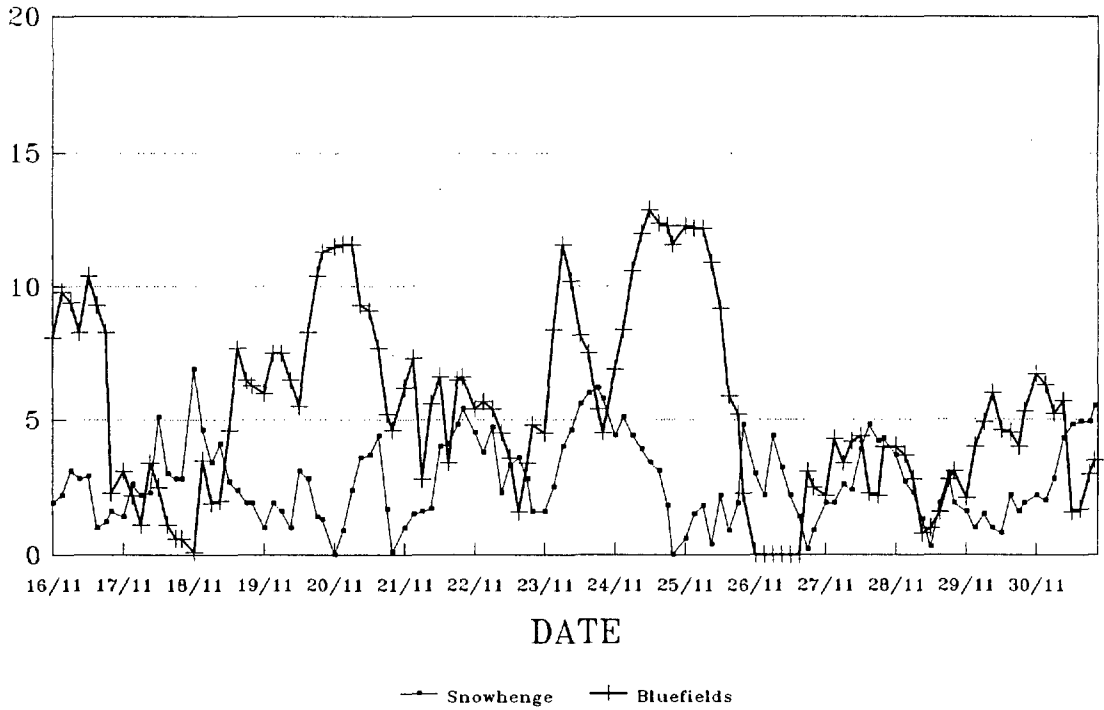


Figure 47. Time series of wind speed and direction November 1 - 15 1993.

16.-30. NOVEMBER 1993
WIND SPEED, M/S



16.-30. NOVEMBER 1993
WIND DIRECTION, DEGREES

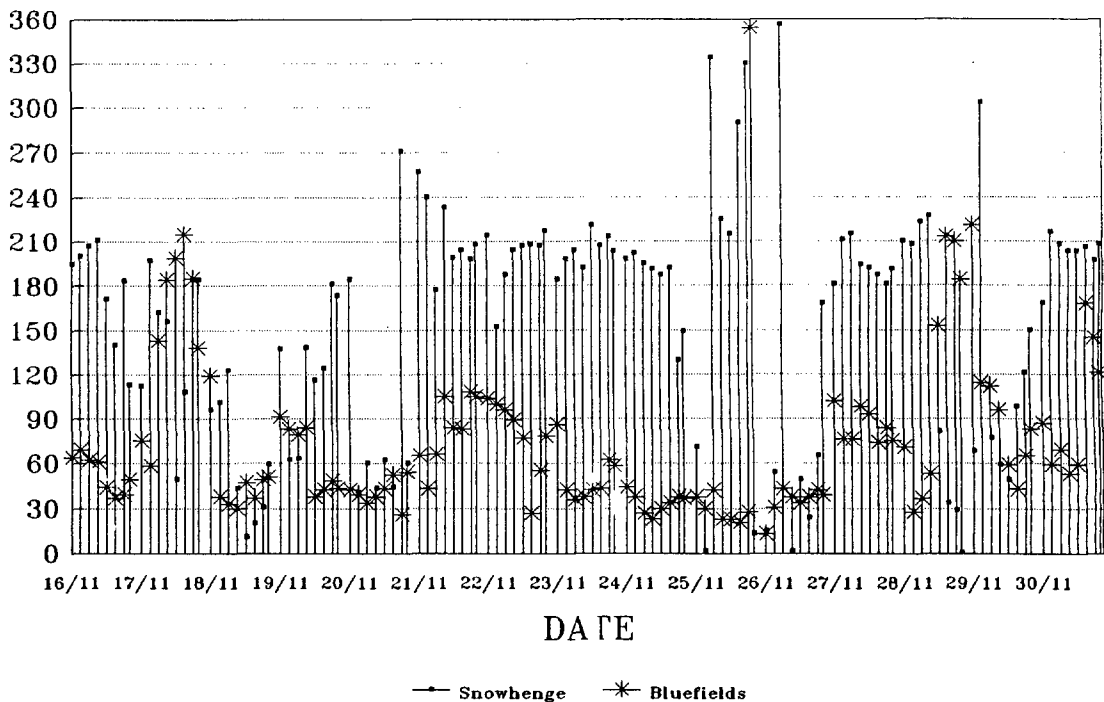
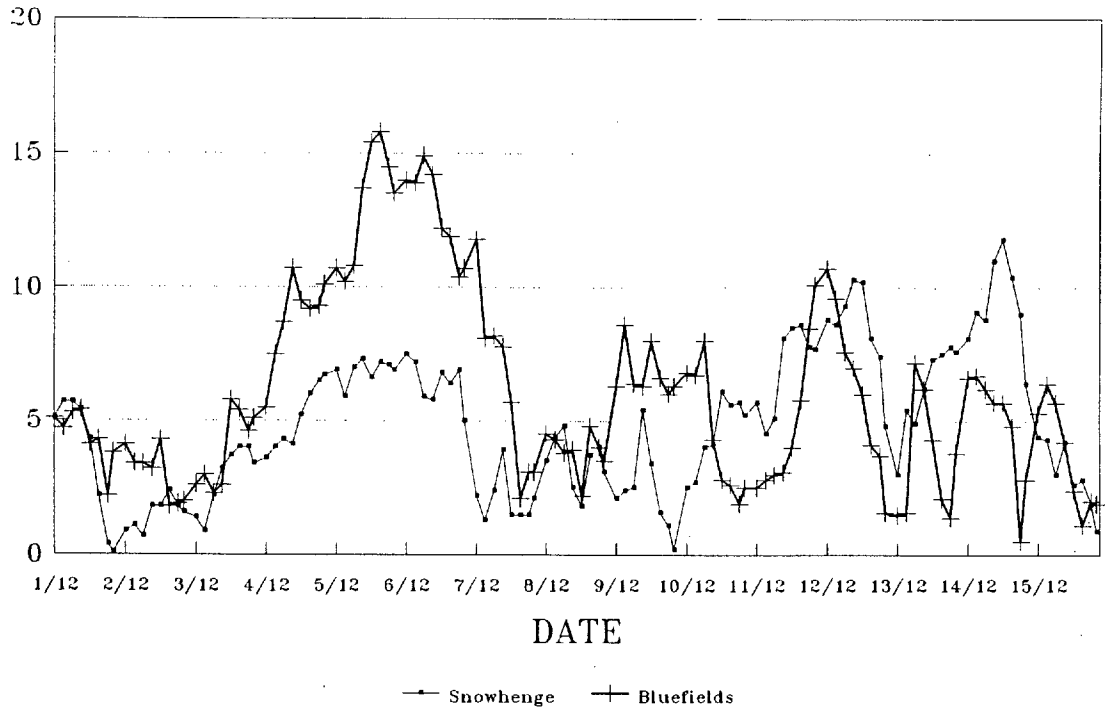


Figure 48. Time series of wind speed and direction June 16 - 31 1993.

1.-15. DECEMBER 1993

WIND SPEED, M/S



1.-15. DECEMBER 1993

WIND DIRECTION, DEGREES

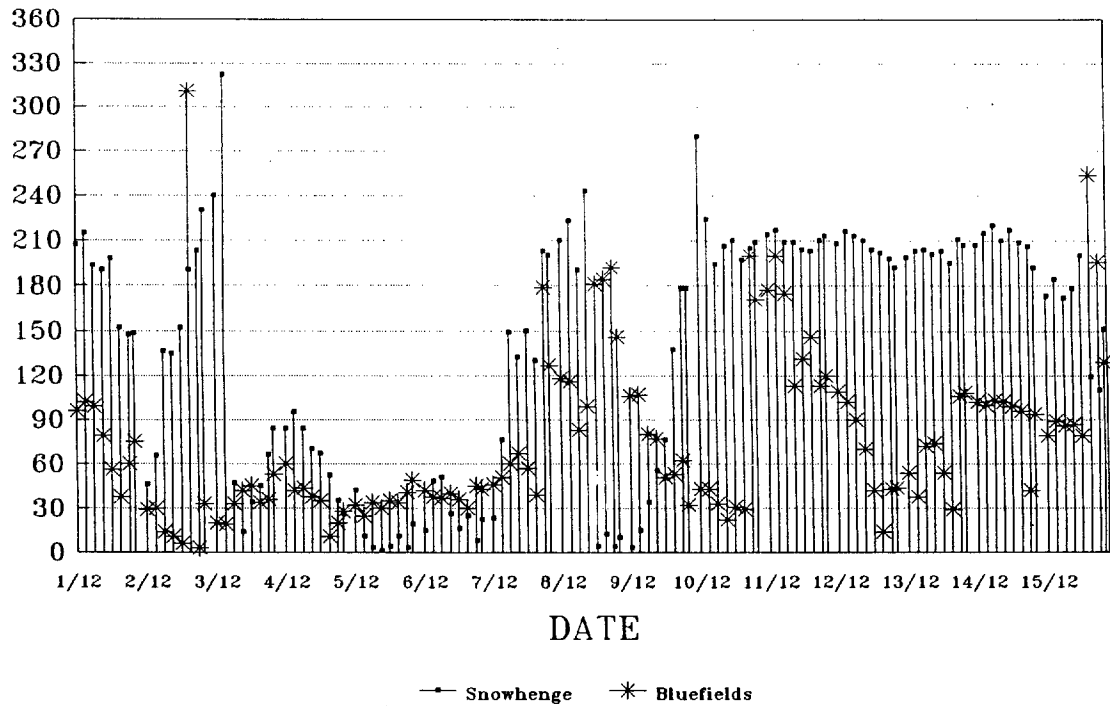
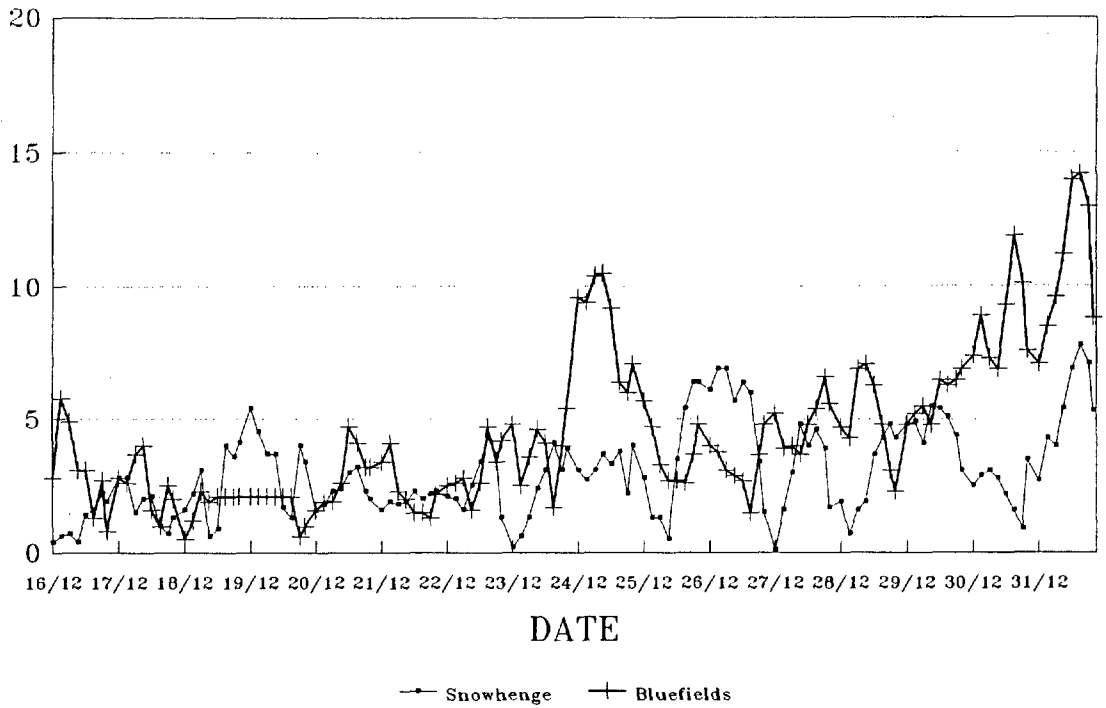


Figure 49. Time series of wind speed and direction December 1 - 15 1993.

16.-31. DECEMBER 1993

WIND SPEED, M/S



16.-31. DECEMBER 1993

WIND DIRECTION, DEGREES

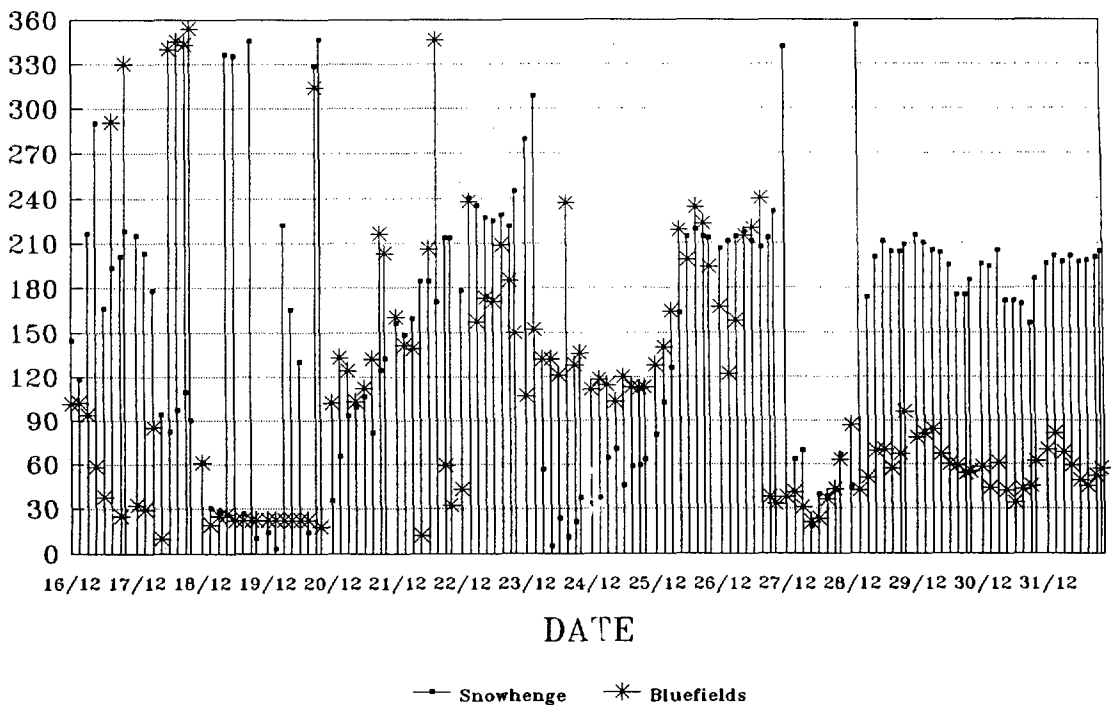
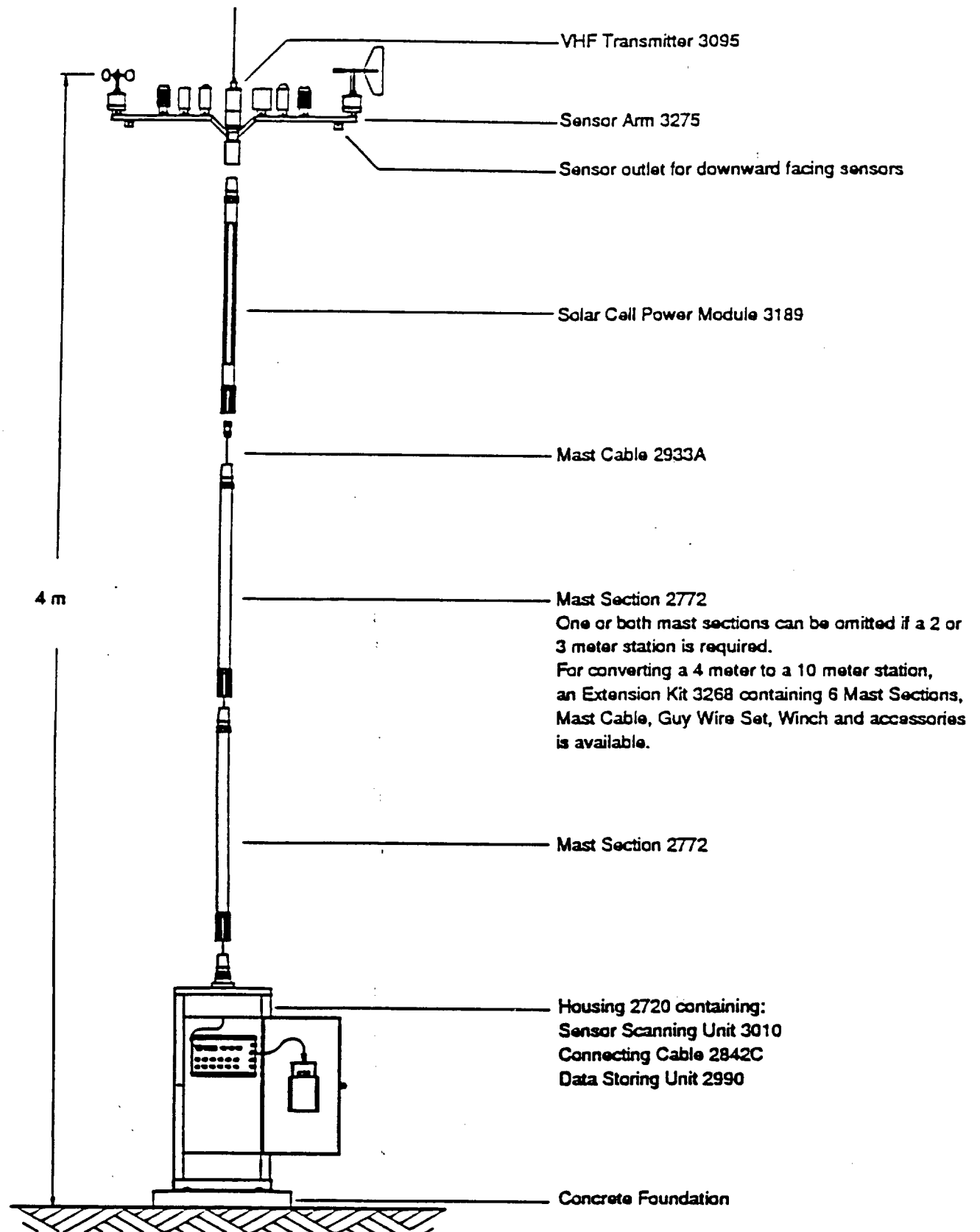
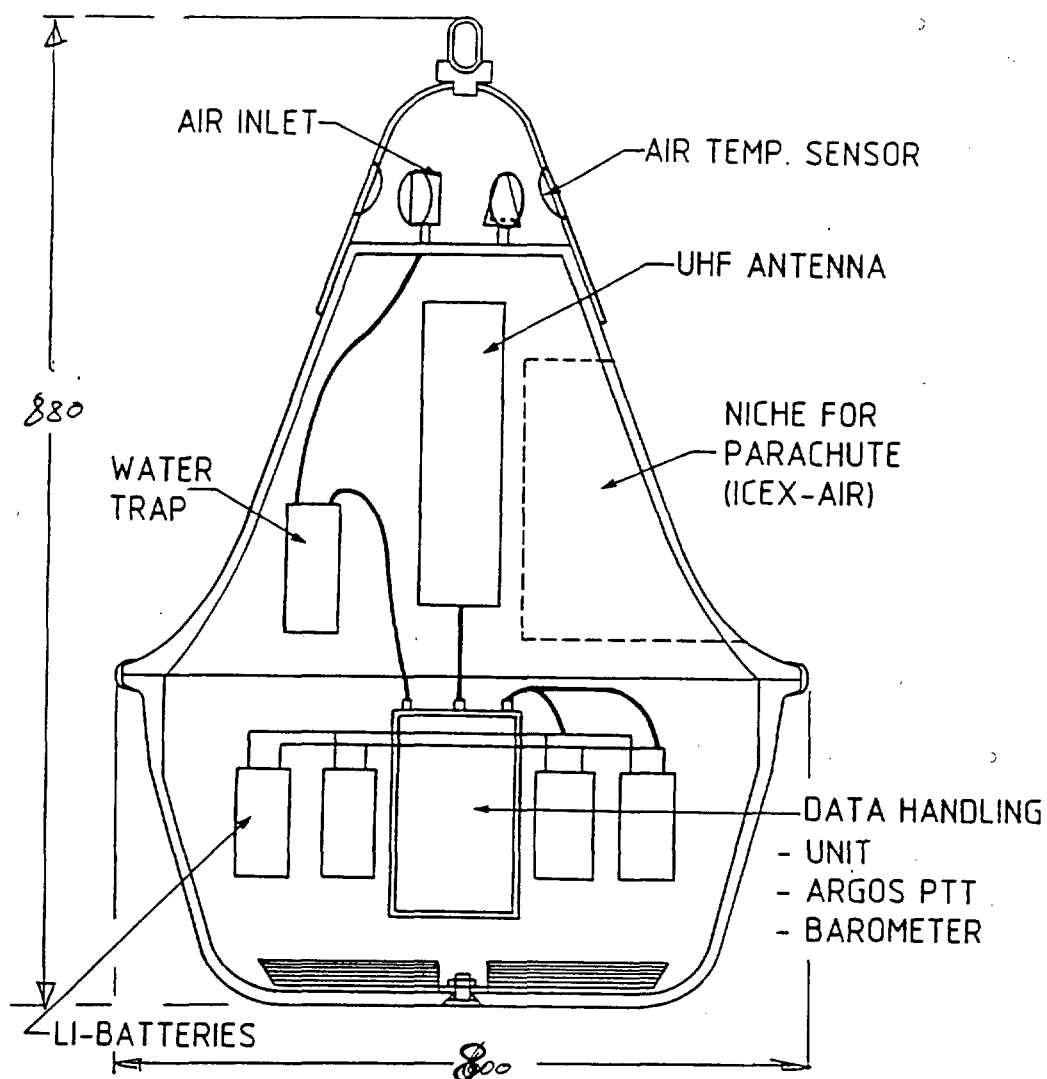


Figure 50. Time series of wind speed and direction December 16 - 31 1993.

AUTOMATIC WEATHER STATION 2700





Sensors:	
Air pressure:	Paroscientific Digiquartz 215 A or 216 B pressure transducer.
Range:	920 - 1060 hPa.
Resolution:	0.13 hPa.
Air temperature	CMI air thermometer, based on Fenwall UUA 32J3 thermistor.
Range:	-60 - +30 °C
Resolution:	0.1 °C
Surface temperature:	CMI thermometer, based on Fenwall UUA 32J3 thermistor.
Range:	-2 - +23 °C
Resolution:	0.1 °C
Range may be modified if required, other sensors may be utilized.	