NOAA Data Report ERL WPL-4

PRELIMINARY REPORT OF HF RADAR MEASUREMENTS OF SURFACE CURRENTS EAST OF THE STRAIT OF GIBRALTAR NEAR MARBELLA, SPAIN: OCTOBER 7-22, 1982 PART II

Wave Propagation Laboratory
Boulder, Colorado
January 1984

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Steve White
John Forberg

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CONTENTS

	Page
Abstract	1
1. INTRODUCTION	1
2. OPERATIONS	1
3. DATA PROCESSING	2
4. DATA PRESENTATION	2
5. ACKNOWLEDGMENTS	2
6. REFERENCES	2
Appendix A.--Current Velocity Maps Averaged Temporally	5
Appendix B.--Current Velocity Maps Averaged Areally	189

FIGURES

Page

1. Radar Site Locations 4

ABSTRACT

During October 1982 the surface currents in the Alboran Sea were mapped with a high-frequency radar system. The currents were measured synoptically over several thousand square kilometers for a period of 15 days. Part I of this report was in the form of surface current vector maps. Here we present the results of temporal and areal filtering of the data contained in Part I.

1. INTRODUCTION

The Sea State Studies Group* is making a study entitled, "Surface Currents at the Southern Spanish Coast," supported by NOAA and the Office of Naval Research, Coastal Sciences Division. This project is part of an international study of the Alboran Sea, Strait of Gibraltar and Gulf of Cadiz region, entitled, "Donde Va".

The primary objective of the 1982 Donde Va field effort was to measure the velocity and structure of the inflowing Atlantic jet, while simultaneously measuring the structure of the western Alboran Gyre. Sea State Studies contributed to this effort by producing synoptic maps of surface currents with a high-frequency (HF) radar system.[1] Herein, we present a compilation of filtered surface current vector maps as a second part to the initial data report for the above-mentioned study.

2. OPERATIONS

Sea State Studies personnel fielded two of NOAA's HF radar systems for a period of 15 days, October 7-22, 1982. The radar sites were separated by 24 km, and their locations were (Fig. 1):

East radar - 36°29'05" N x 04°44'23" W, Puerto Cabopino.
West radar - 36°27'42" N x 05°00'18" W, Punta de Banos.

The radars were operated at a frequency of 25.4 MHz, with a transmit pulsewidth of 16 μs, (the effects of these parameters are described in [2]). For this experiment, a 9-min (2048 data point) sample was taken once every 20 min at each station. Some observations were missed due to equipment failure or power outages. Although the nighttime map coverage is about 3 x 10^3 km, daytime RF interferences (ship traffic and general rise in RF noise) significantly reduced this areal extent.

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* Wave Propagation Laboratory (WPL), National Oceanic and Atmospheric Administration (NOAA), U.S. Dept. of Commerce, 325 Broadway, Boulder, Colorado, 80303.

3. DATA PROCESSING

As a supplement to the "raw" vector maps presented in Part I, two simple filters are applied to demonstrate techniques for increasing map vector density. Inputs to these filters are the interpolated radial files described in Part I of this report.

The first filtering method, a temporal average of three sequential observations, produced an averaged map spanning one hour. The second method is a spatial average of five adjacent two-degree angle bins, which resulted in a ten-degree angular smoothing. The implications of these filters numerically and oceanographically are left to future reports.

4. DATA PRESENTATION

The filtered surface current vector maps are presented in the following sections. More sophisticated filters can be applied to reduce noise and extend range,[4] but discussions on impacts to the data are so numerous they cannot be presented here.

The reader should also note that changes in the areal coverage and random flyers in the maps can generally be attributed to one of the following:

1. Triangulation errors (see [5]).
2. Attenuation due to sea surface roughness (see [6]).
3. Man-made atmospheric noise.
4. Local radio interference near operating frequency.

Tests done in June 1983 have indicated that there was a minor hardware problem during this experiment. The effects and extent of this problem are not known at this time.

5. ACKNOWLEDGMENTS

We acknowledge the support of the Sea State Studies personnel. They designed and constructed the radar system used for this study and operated this system in the field. We especially thank Bob Weber and Patty Miller for their guidance and consultation.

Support for this project was provided by NOAA and the Office of Naval Research (ONR), Coastal Sciences Division.

REFERENCES

[1] Barrick, D. E., and Evans M. W. (1976): Implementation of coastal current-mapping HF radar systems. NOAA Tech. Rept. ERL 373-WPL 47.

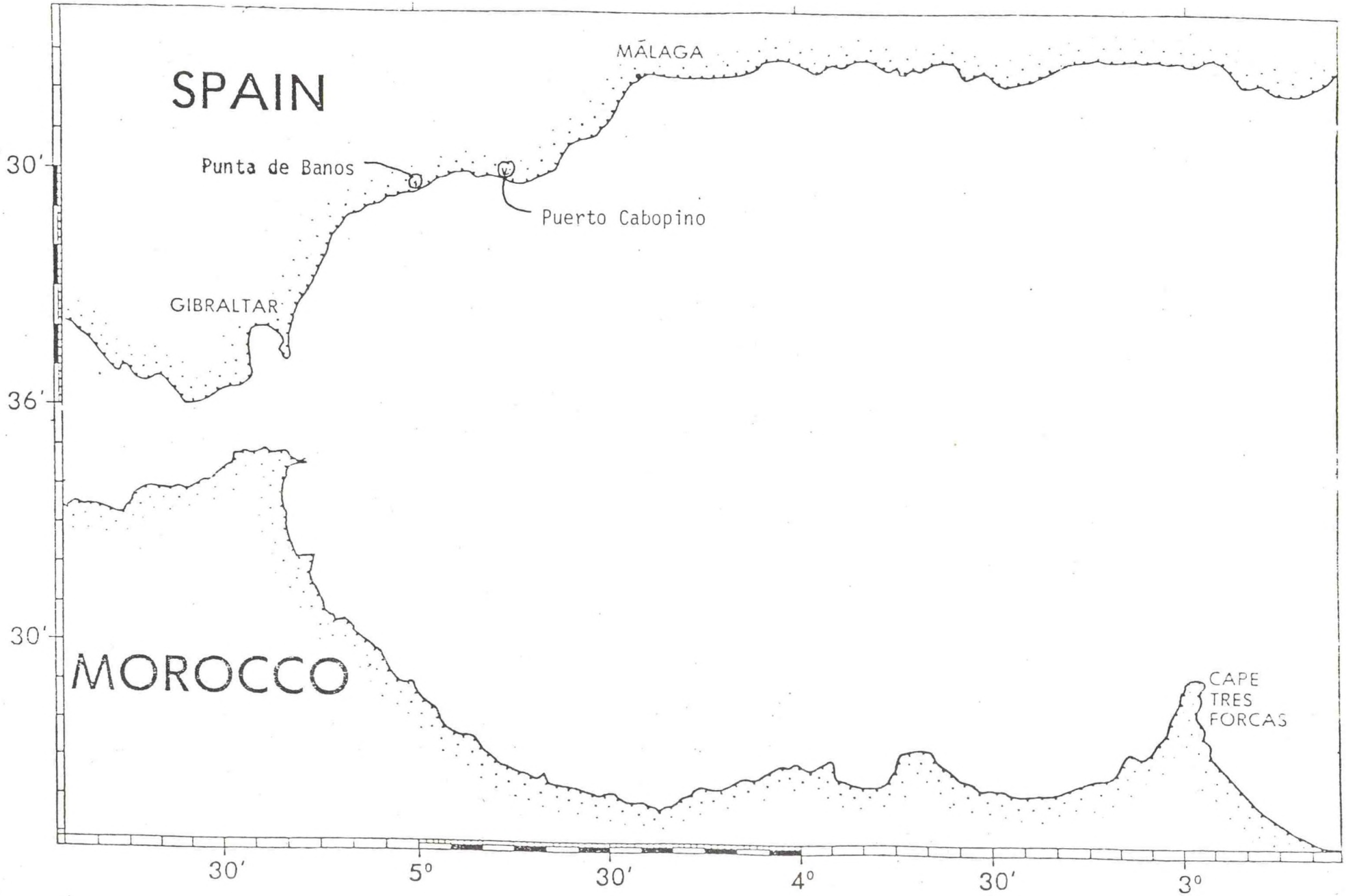
[2] Barrick, D. E., Evans, M. W., and Weber, B. L. (1977): Ocean surface currents mapped by radar. Science, 198, 138-144.

[3] Miller, P. A., and Leise, J. A. (1982): Radar Doppler detection methods with applications to CODAR. NOAA Tech. Memo. ERL WPL-94.

[4] Frisch, A. S., and Leise, J. A. (1981): A note on using continuity to extend HF radar surface-current measurements. Journal of Geophysical Research, vol. 86, no. C11, 11089-11090.

[5] Leise, J. A. (1982): Radar geometry of surface velocity maps. NOAA Tech. Memo. ERL WPL-33.

[6] Barrick, D. E., and Peake, W. H. (1968): A review of scattering from surfaces with different roughness scales. Radio Science, vol. 3, no. 8, 865-868.


SPAIN
MÁLAGA
Punta de Banos
Puerto Cabopino
GIBRALTAR
MOROCCO
CAPE
TRES
FORCAS
30'
36'
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30'
5°
30'
4°
30'
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Figure 1

Appendix A. Current Velocity Maps Averaged Temporally

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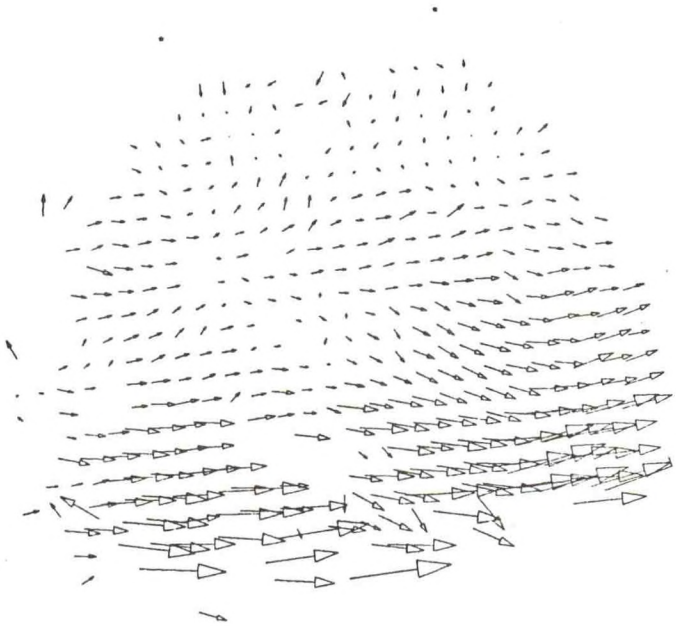

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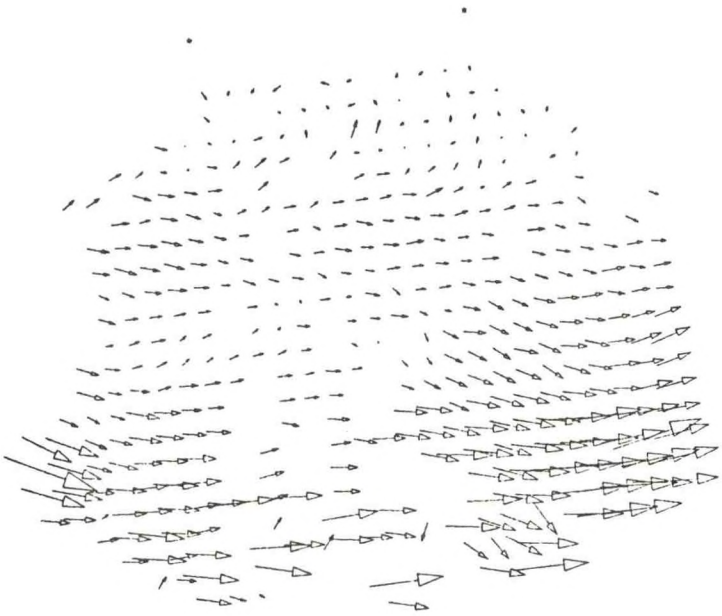

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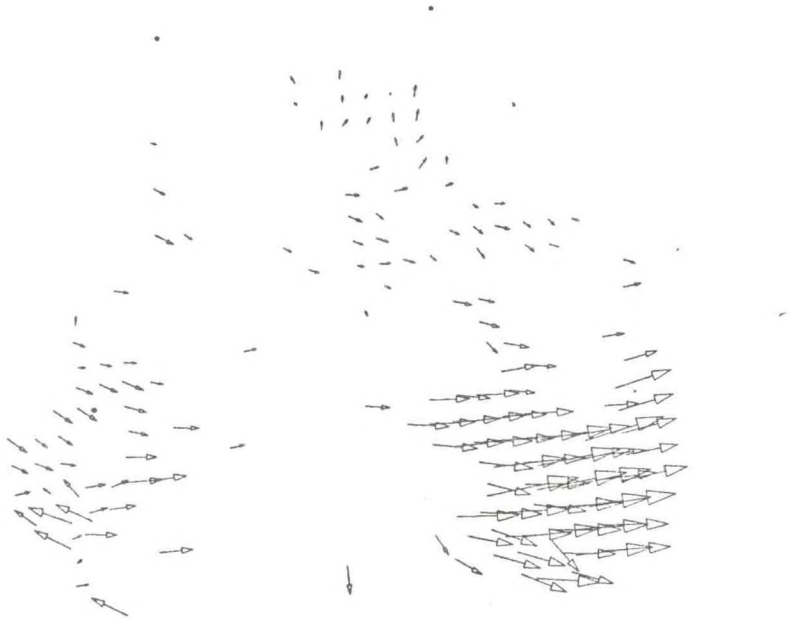

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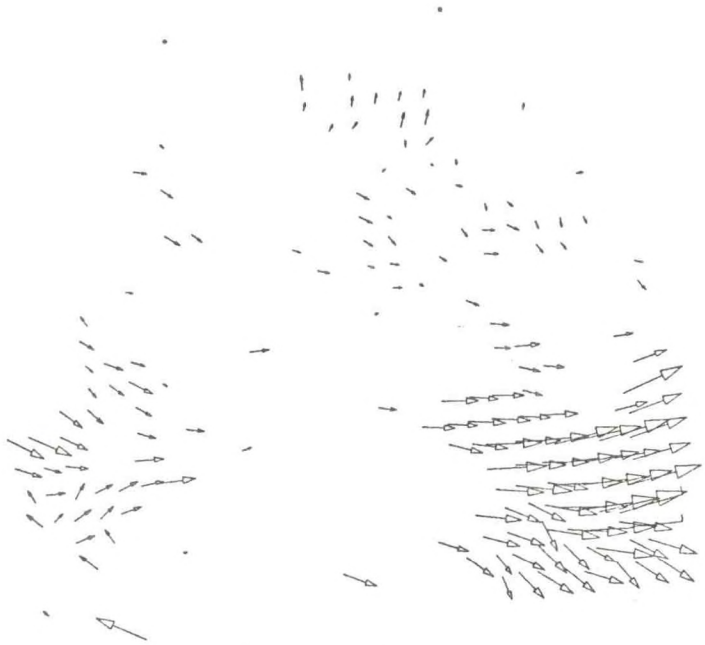

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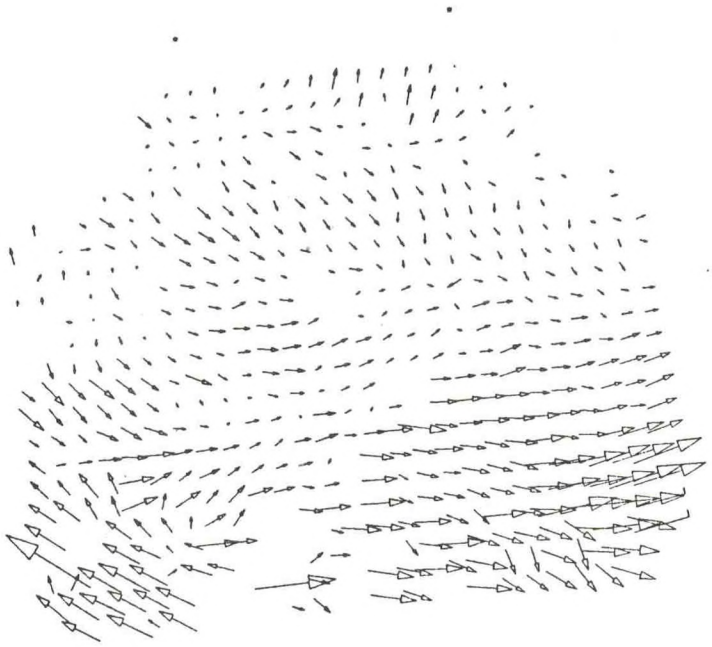

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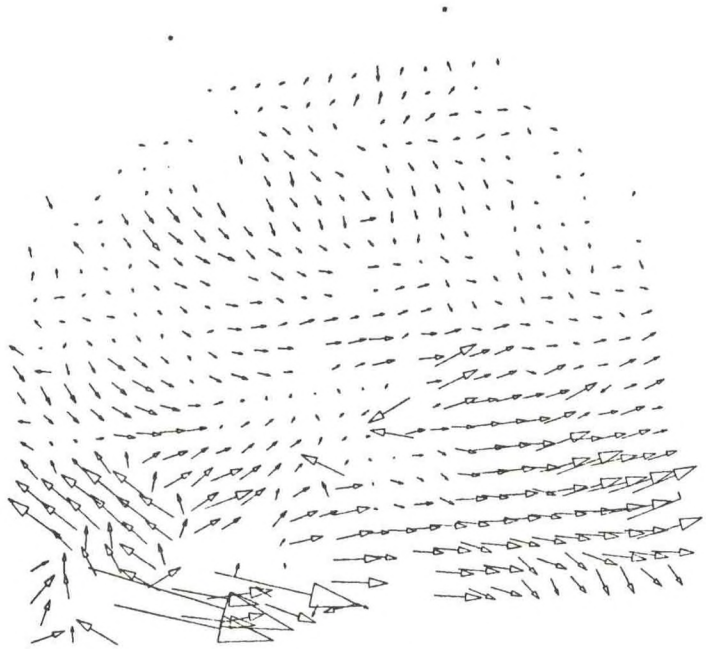

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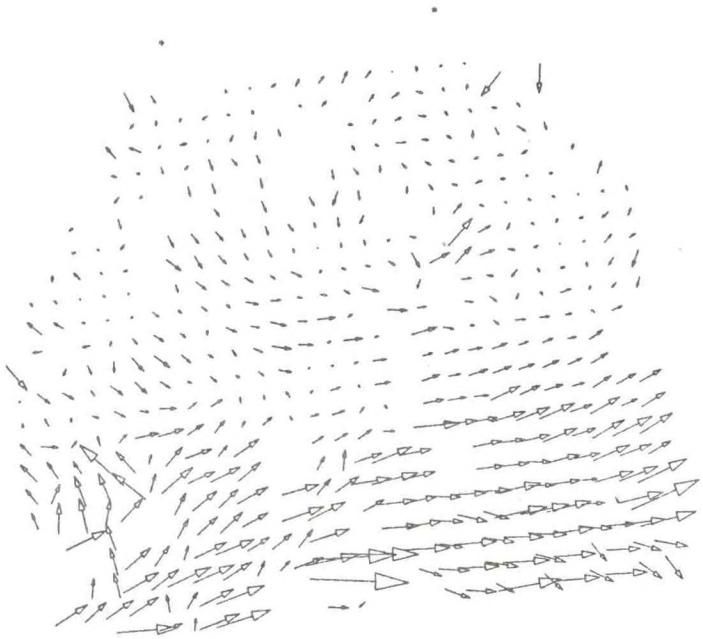

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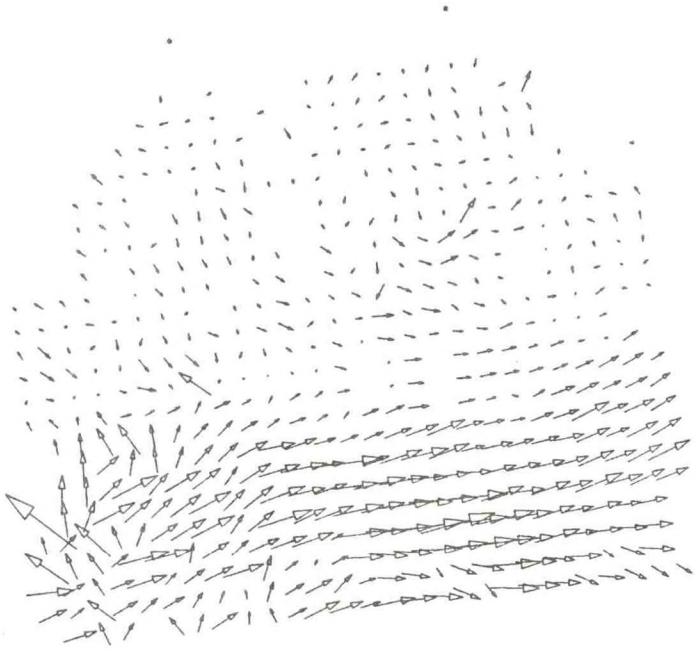

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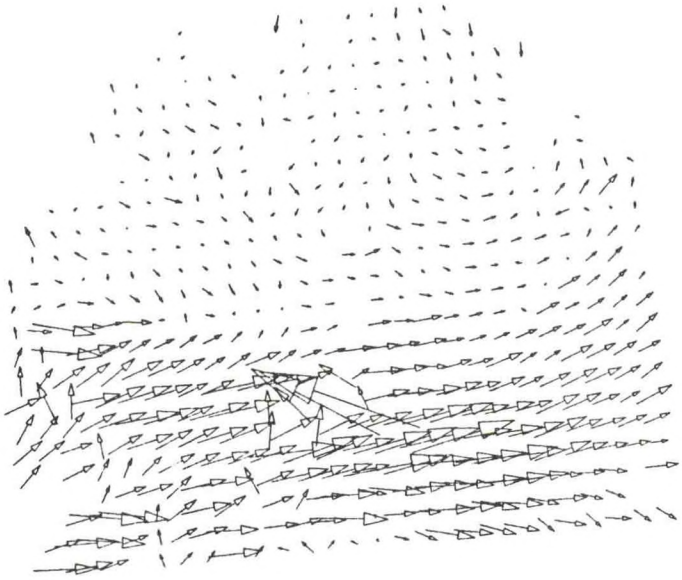

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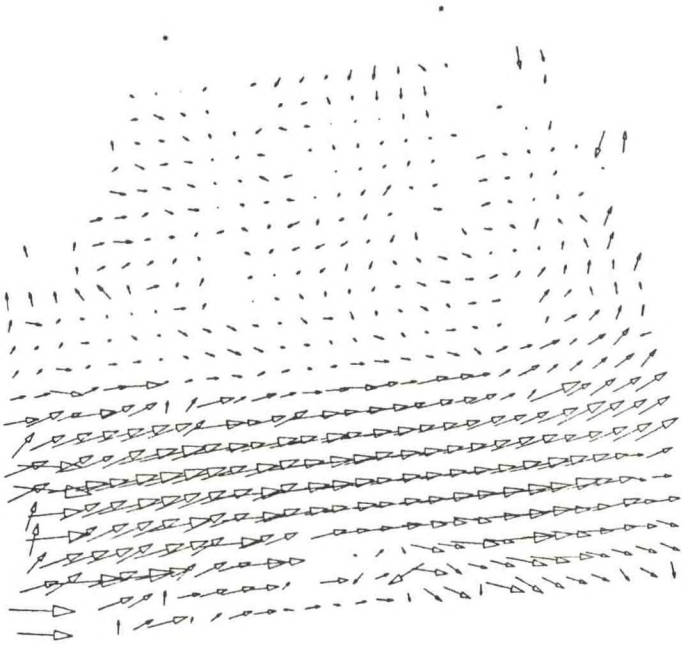

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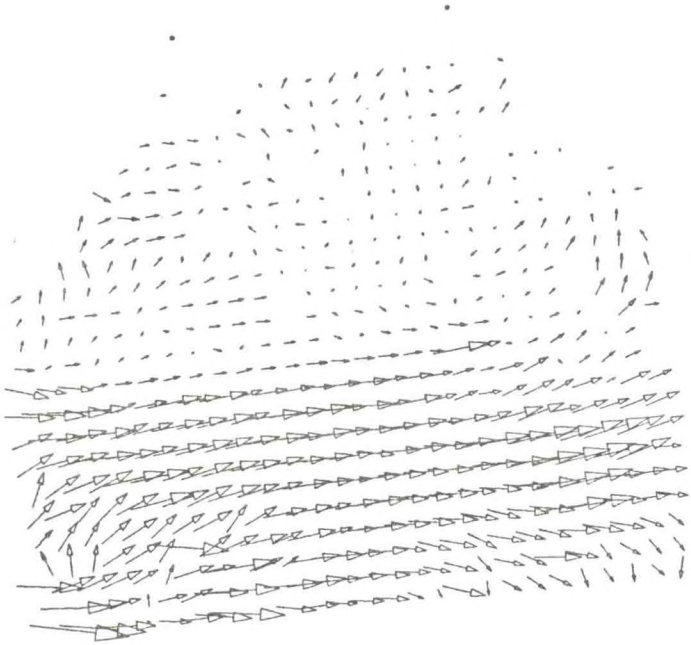

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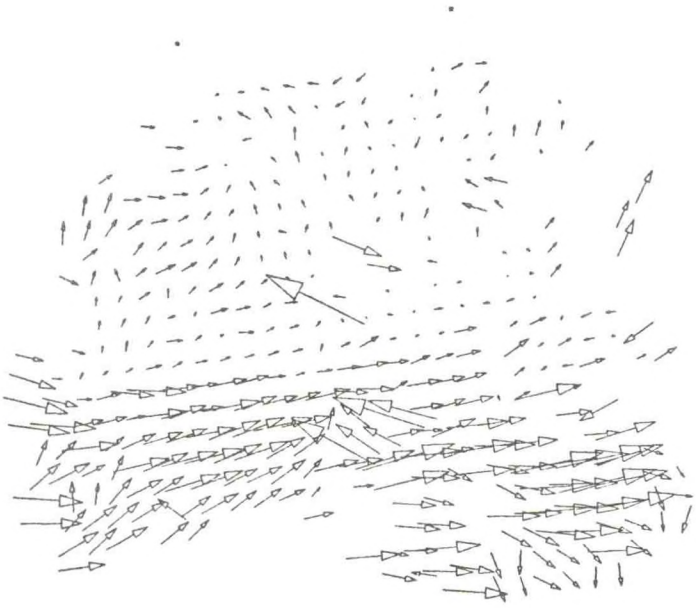

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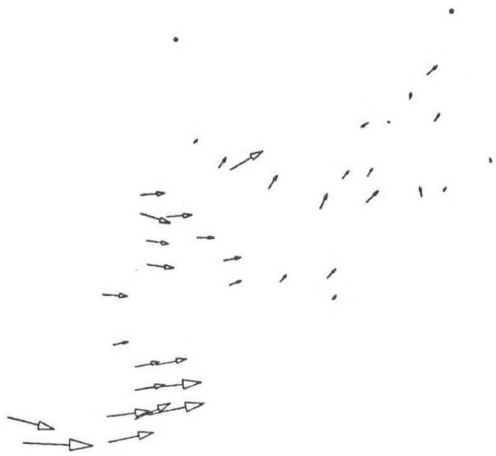

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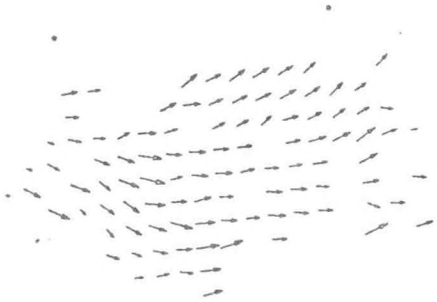

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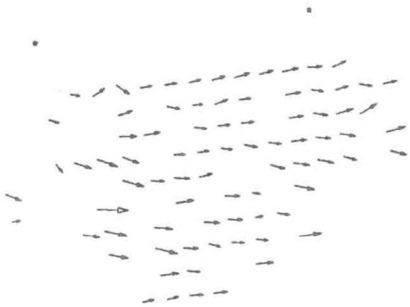

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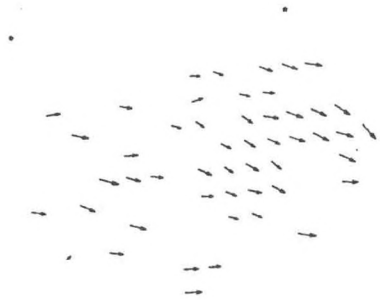

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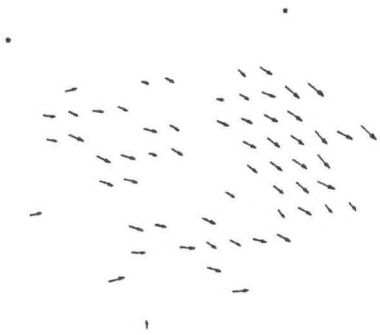

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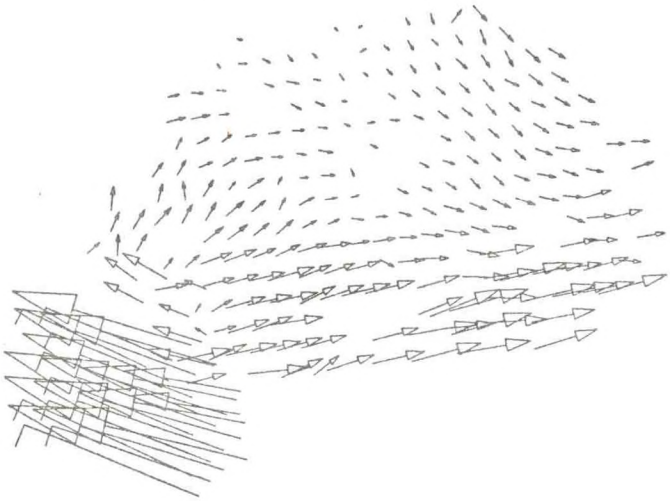

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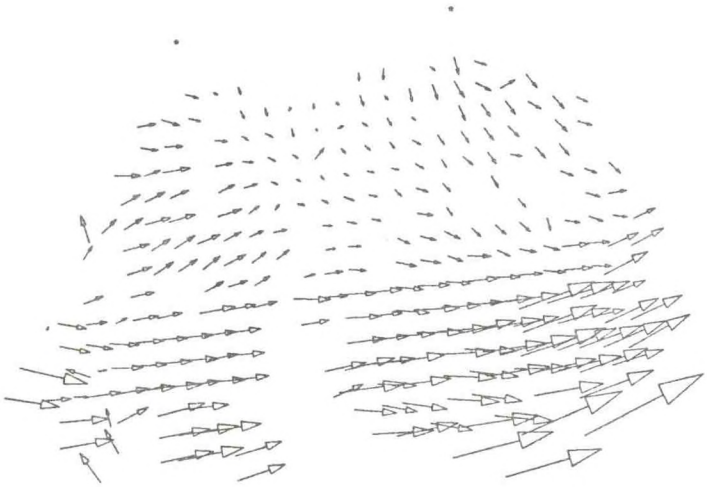

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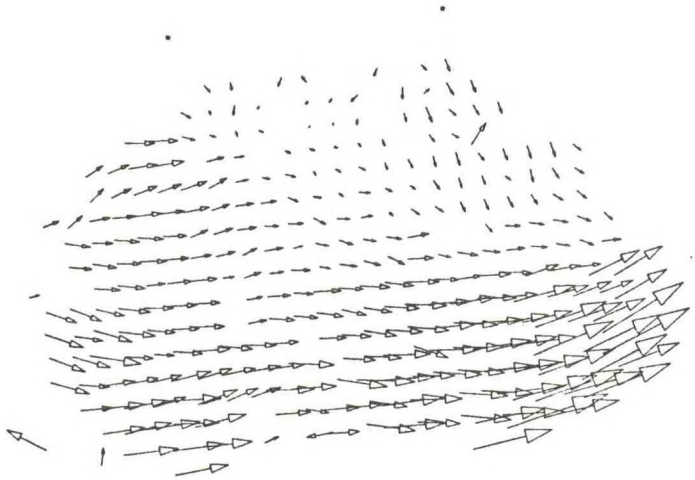

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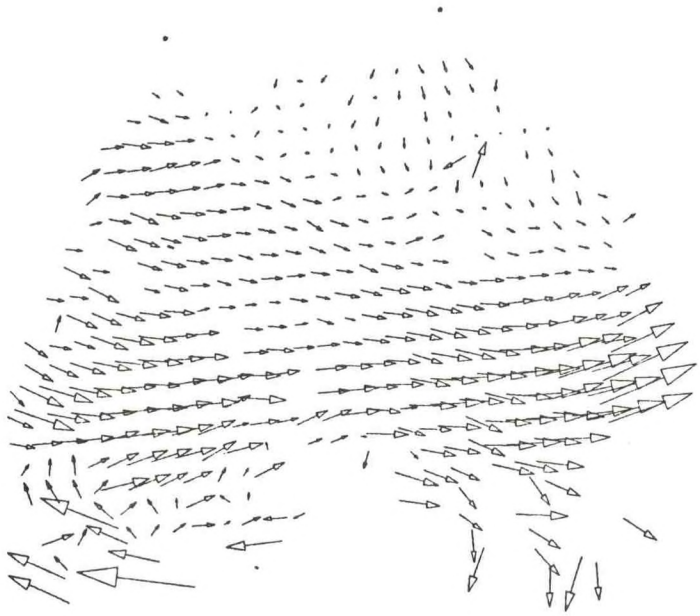

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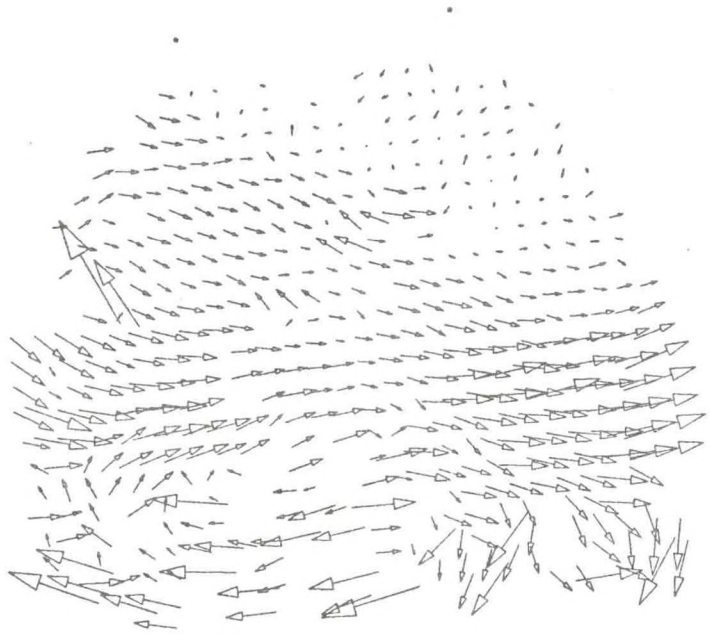

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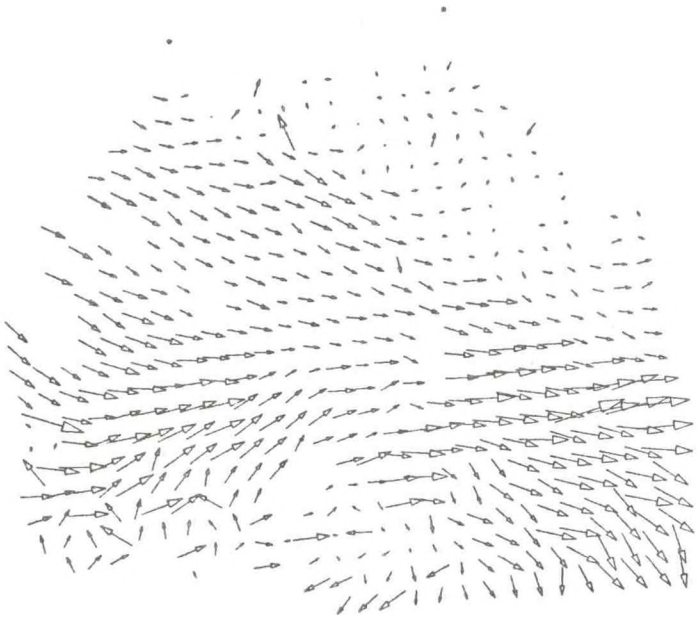

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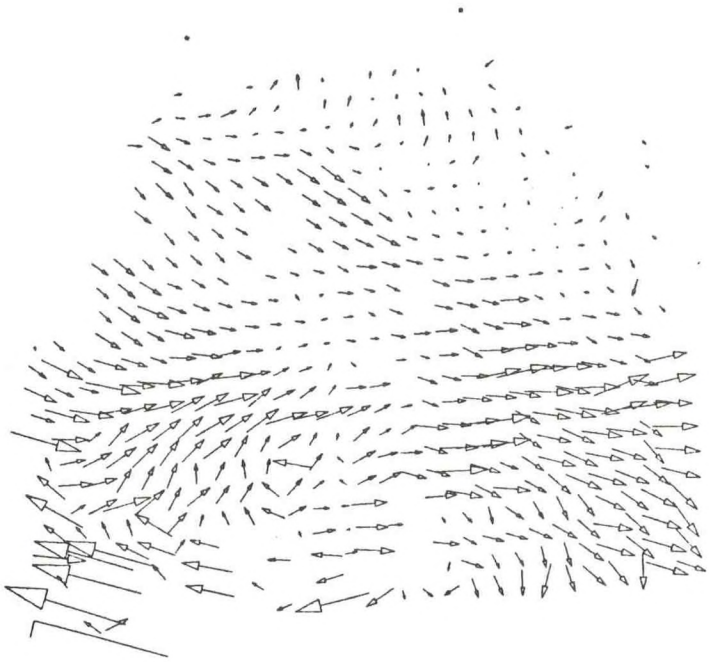

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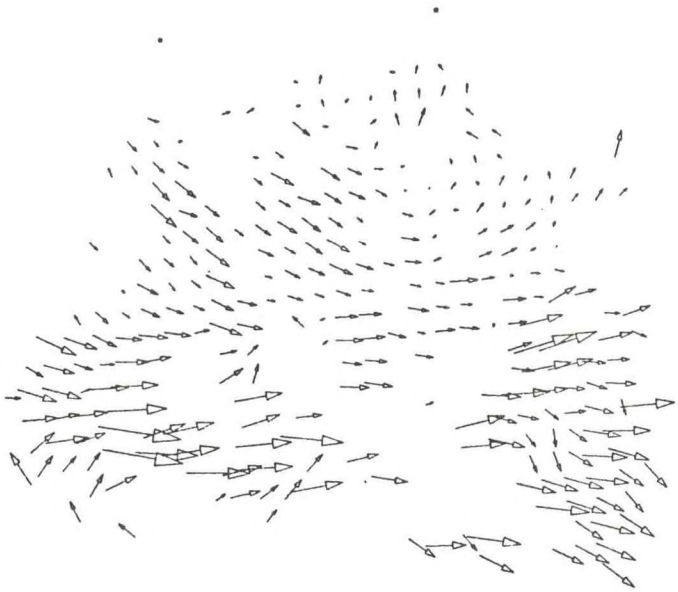

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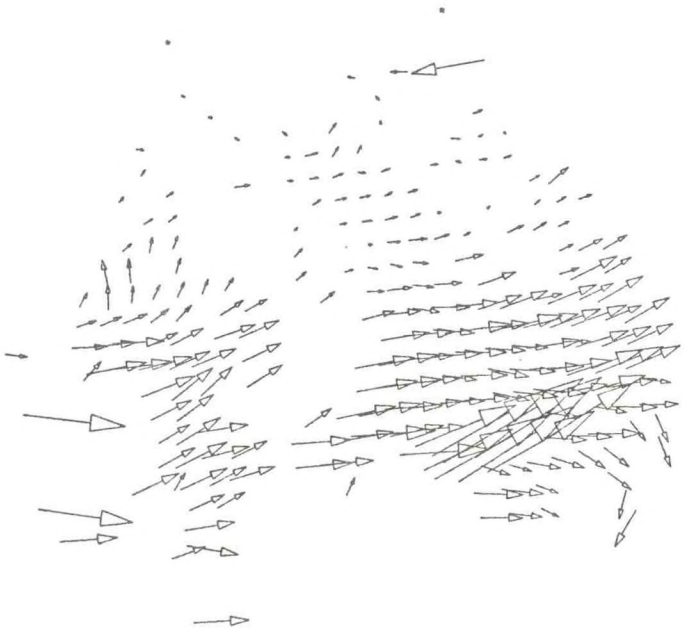

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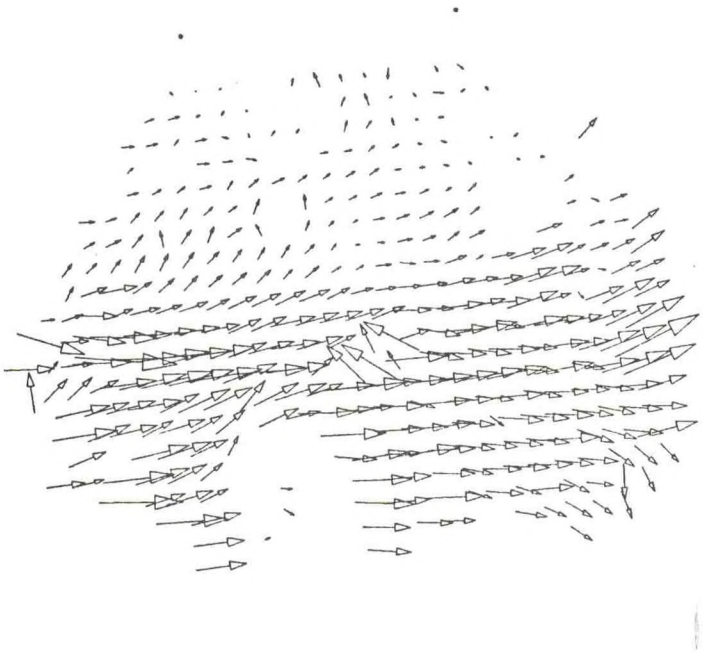

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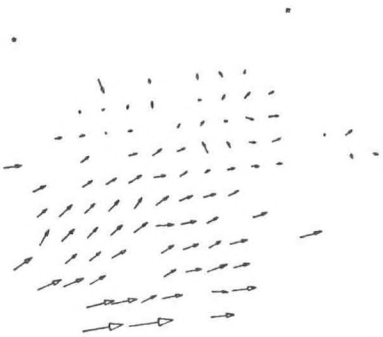

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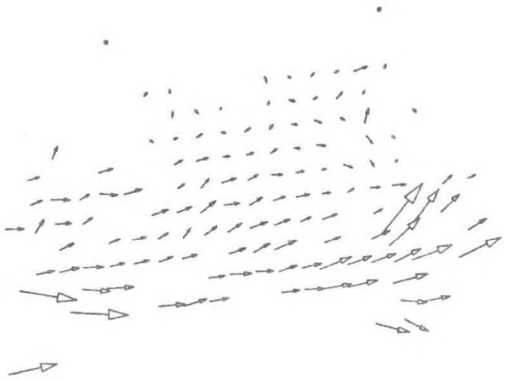

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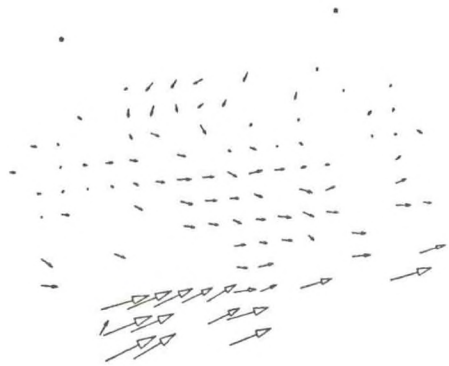

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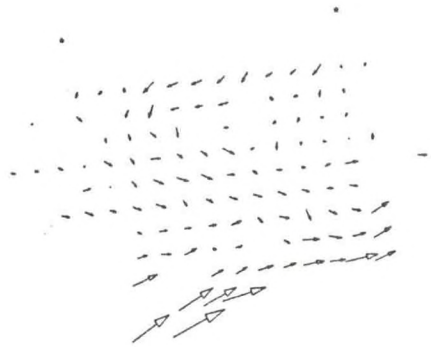

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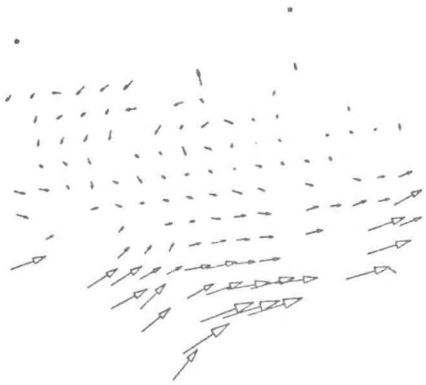

1940 09-OCT-82
1950 09*OCT*82

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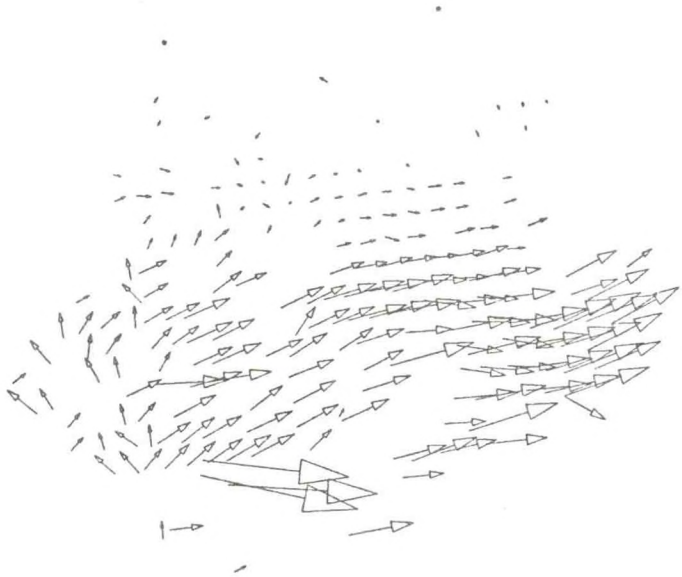

2040 09-OCT-82
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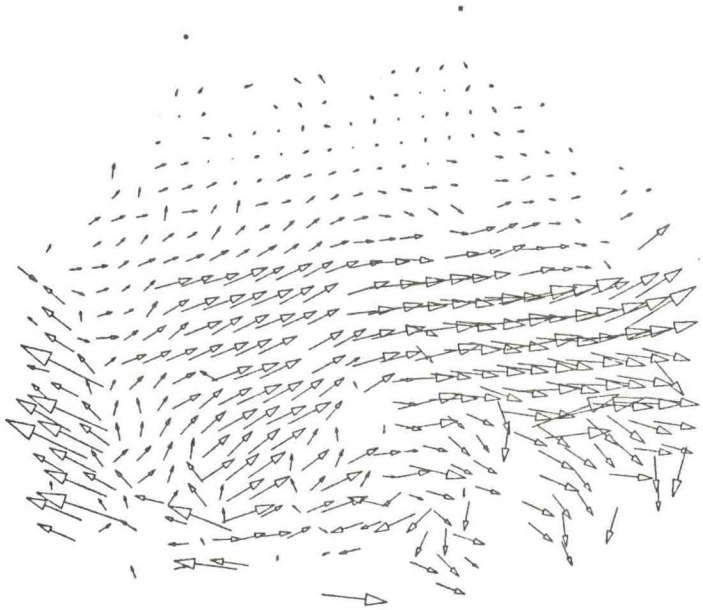

2140 09-OCT-82
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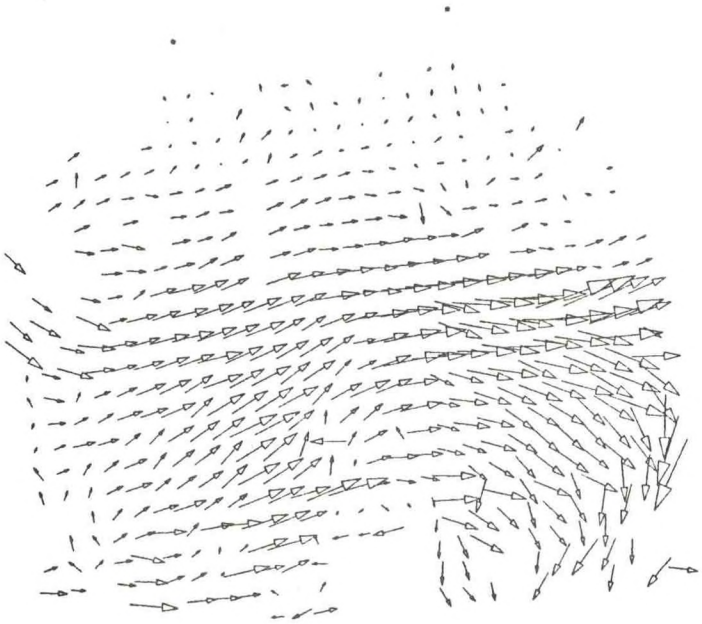

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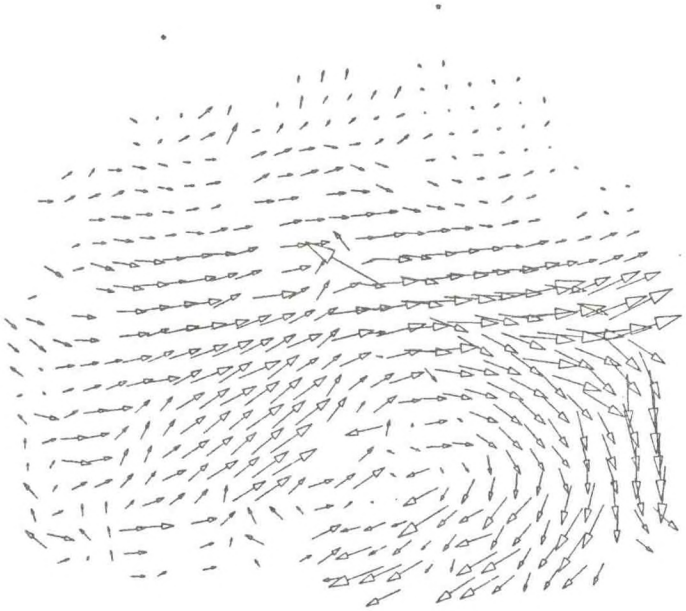

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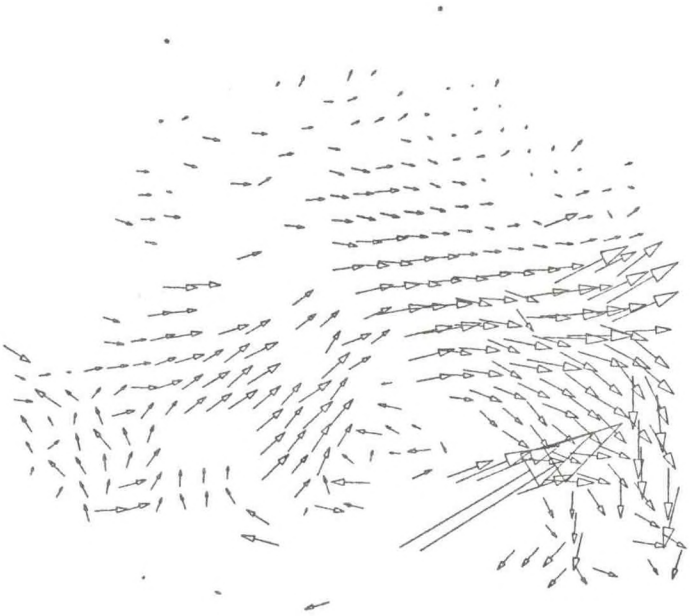

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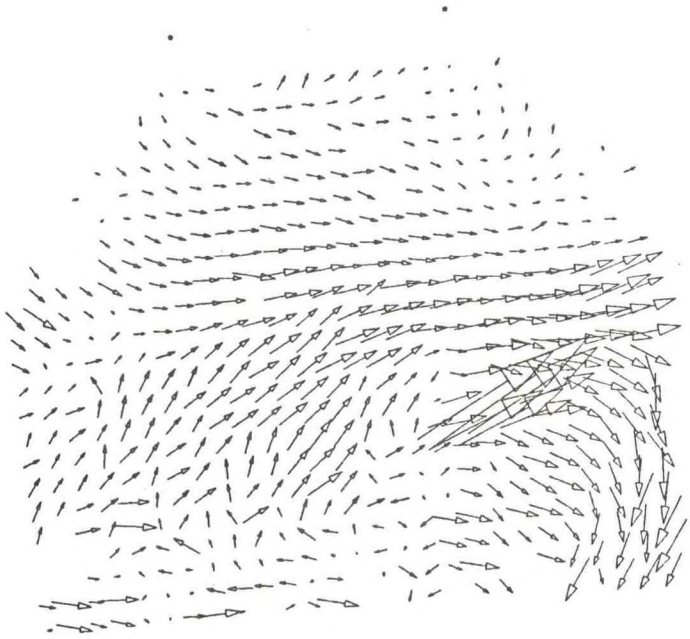

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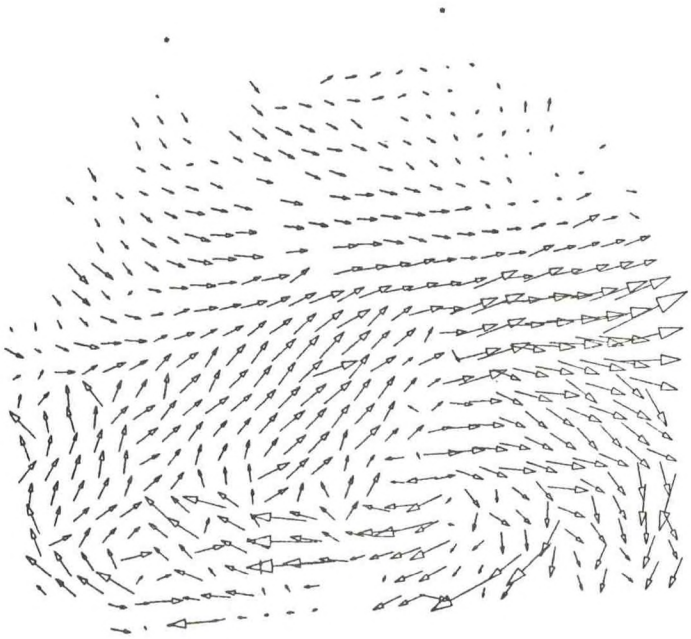

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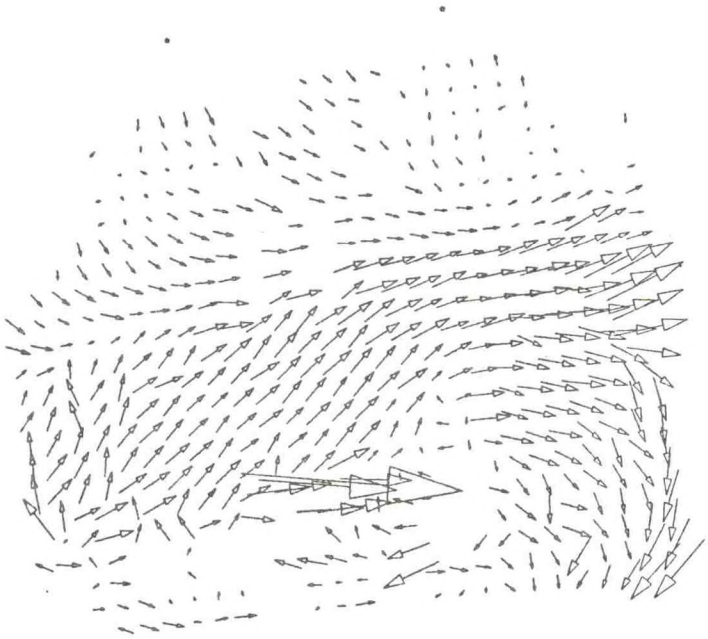

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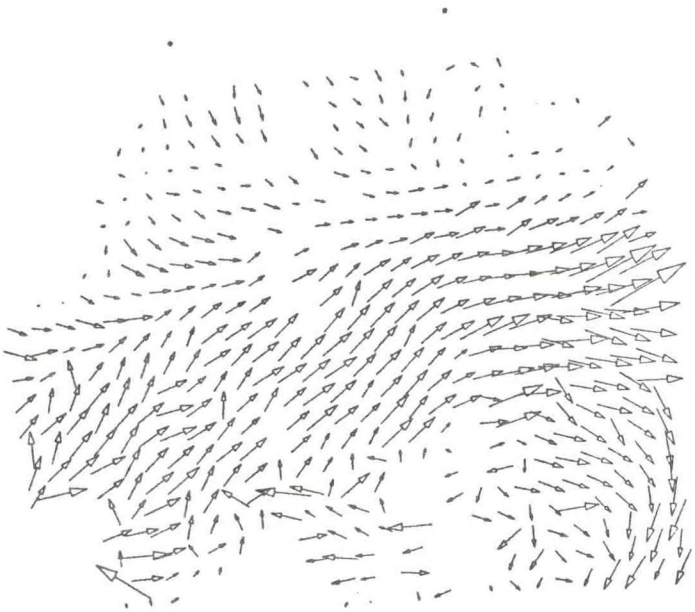

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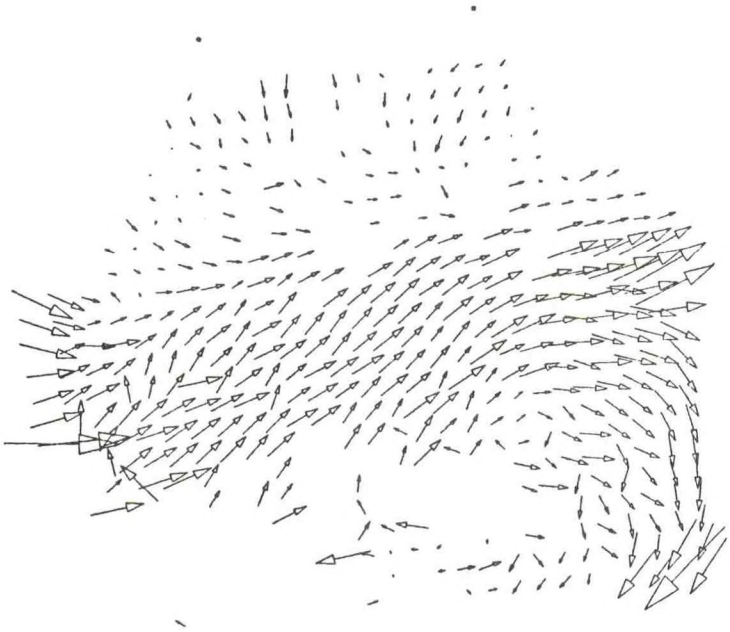

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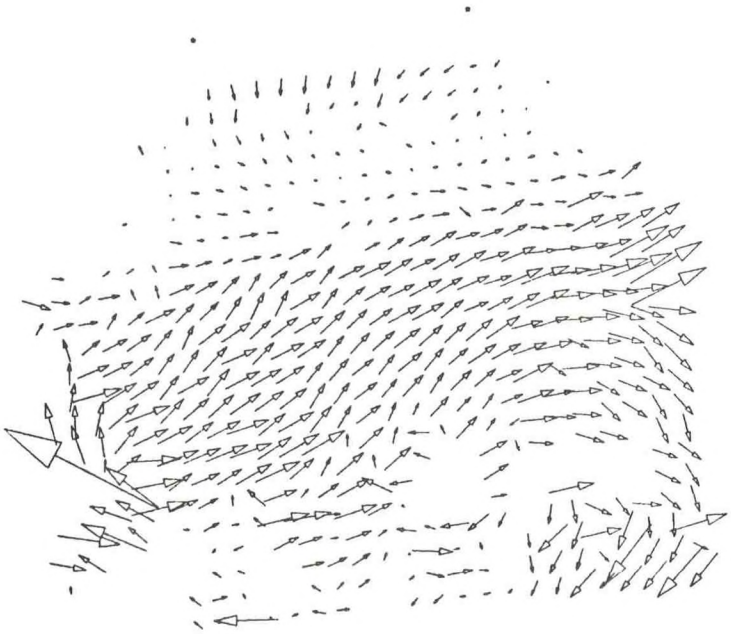

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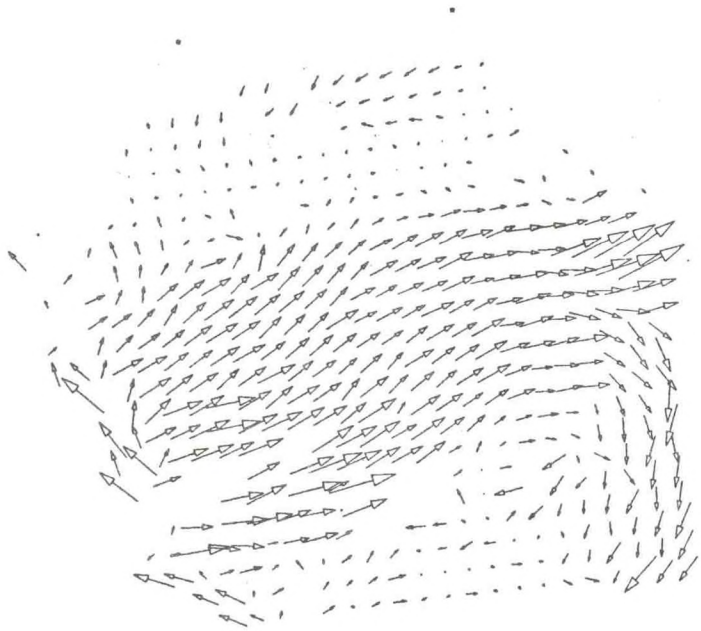

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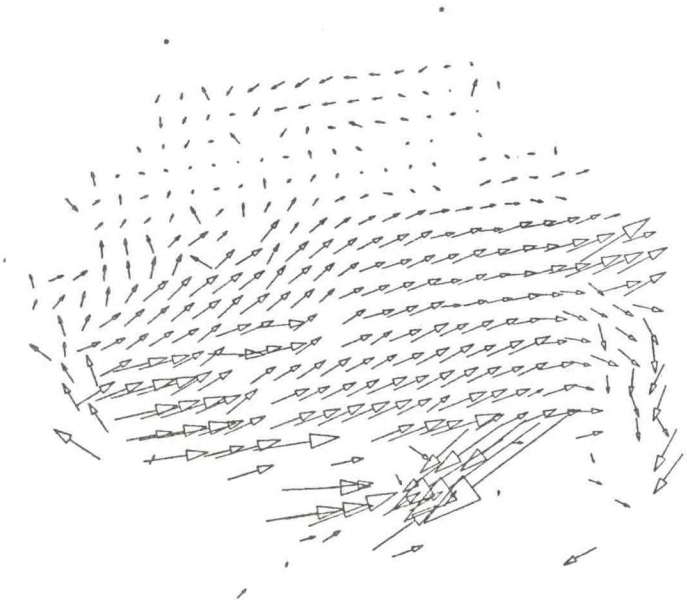

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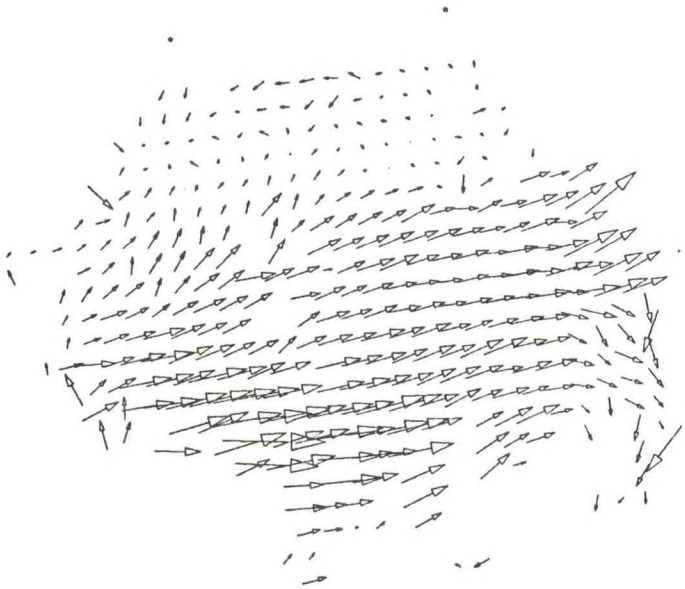

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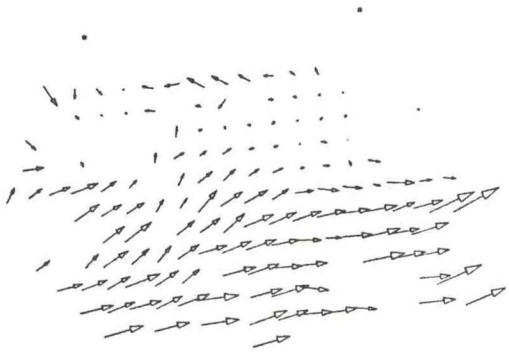

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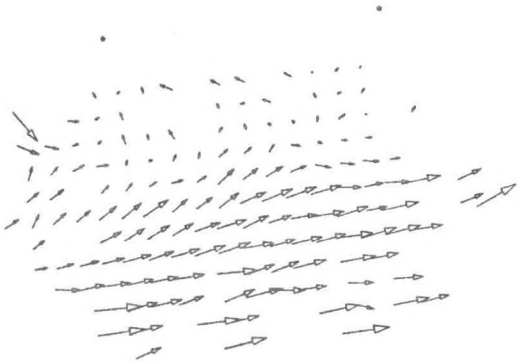

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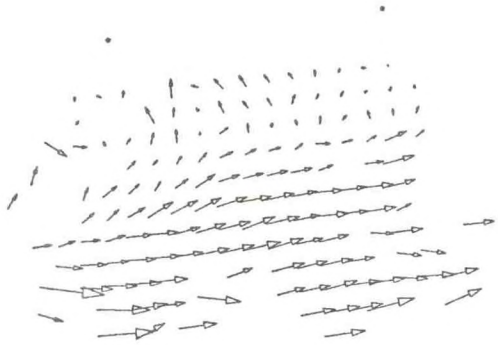

1240 10-OCT-82
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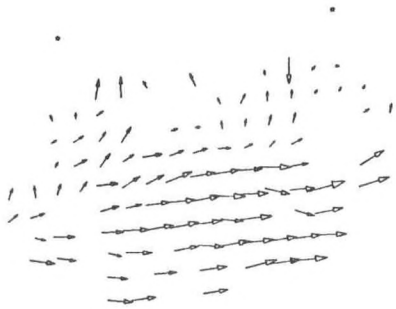

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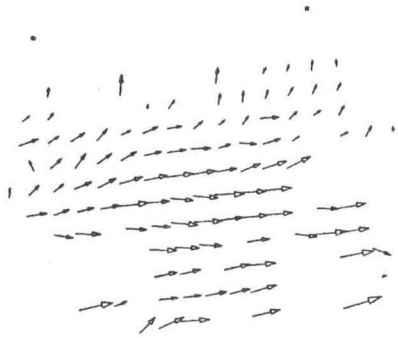

1440 10-OCT-82
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8.0 KM , 200.0 CM/S

TRUE NORTH

1540 10-OCT-82
1550 10-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

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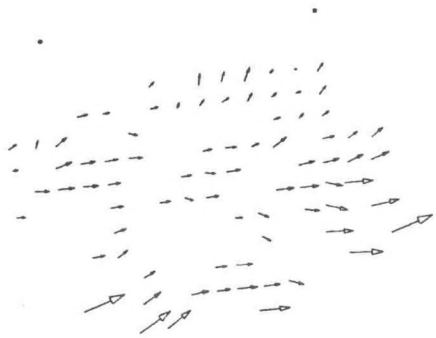
TRUE NORTH



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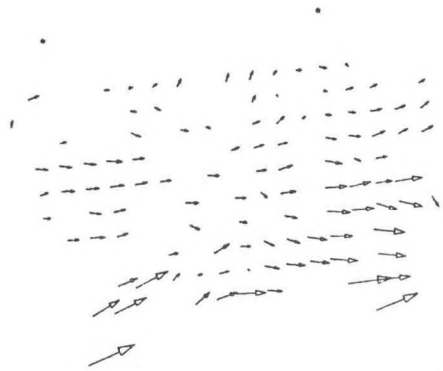

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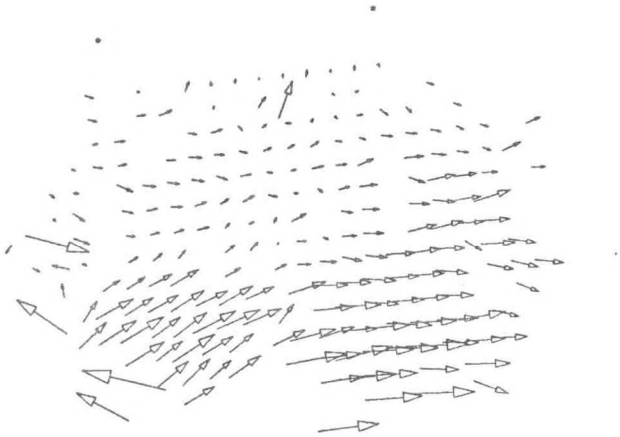

1940 10-OCT-82
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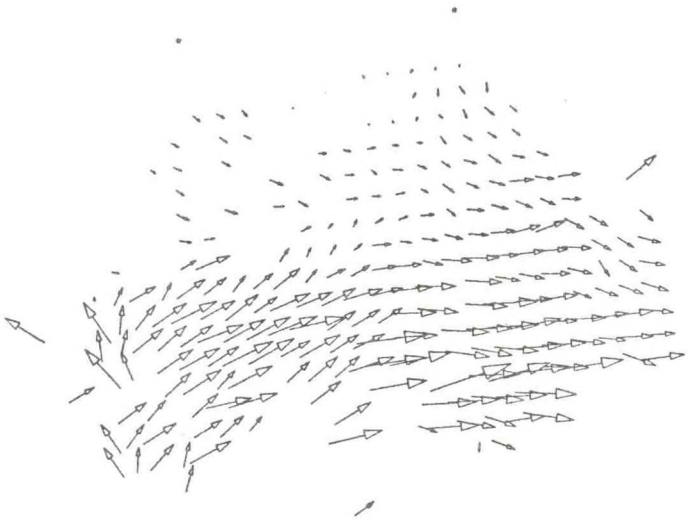

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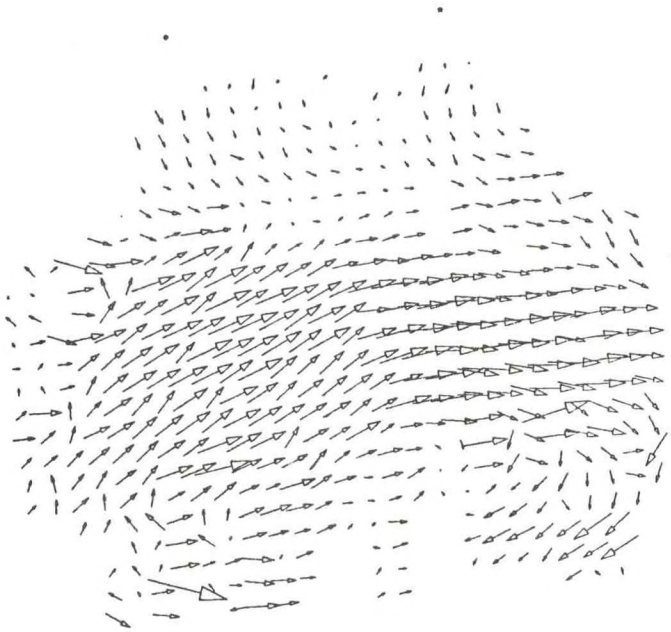

2140 10-OCT-82
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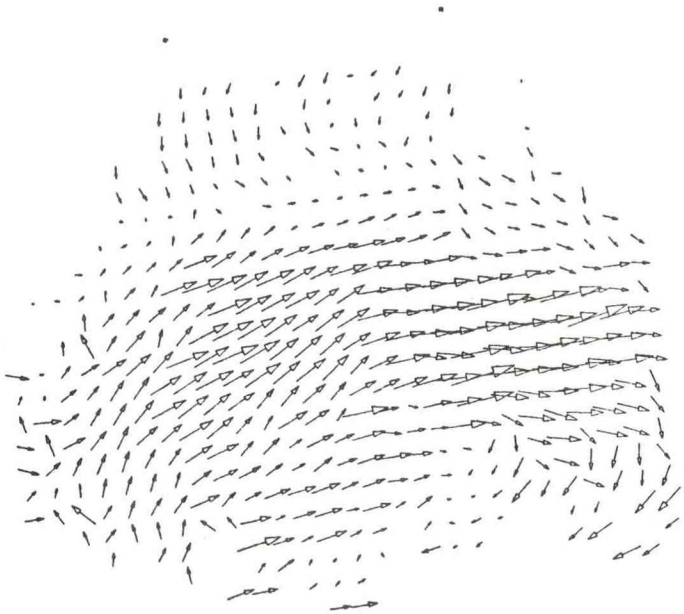
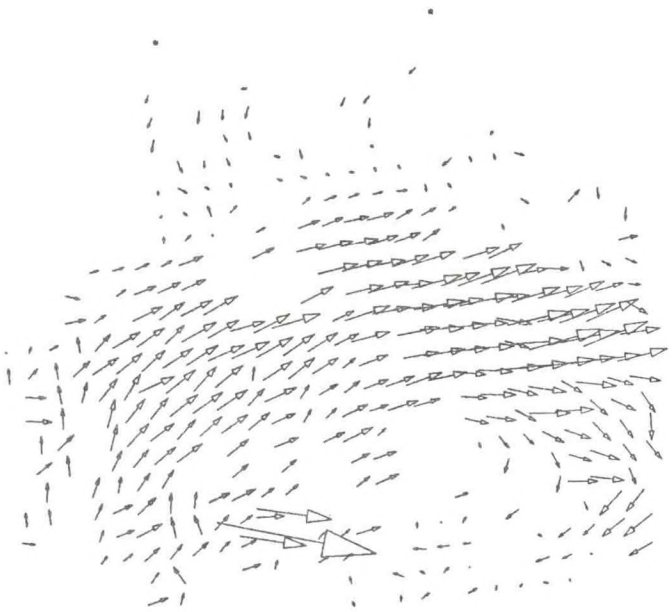


2240 10-OCT-82
2250 10-OCT-82

8.0 KM , 200.0 CM/S

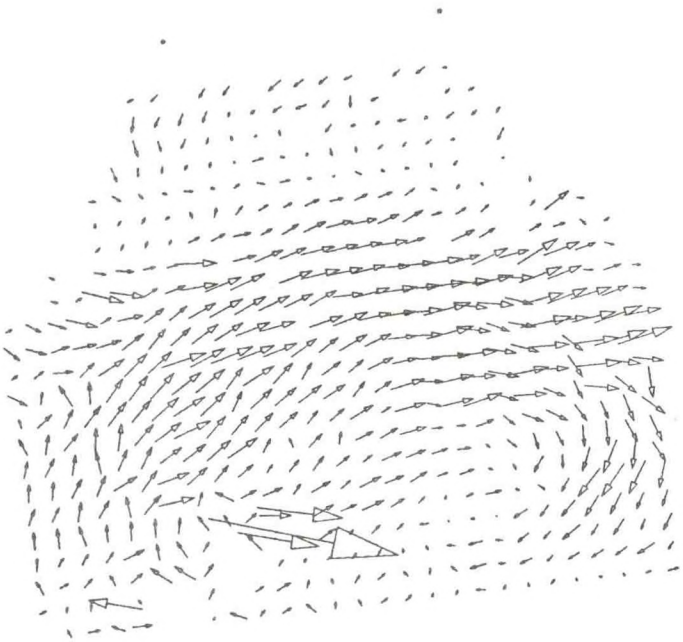
TRUE NORTH ↑



2340 10-OCT-82
2350 10-OCT-82

8.0 KM , 200.0 CM/S

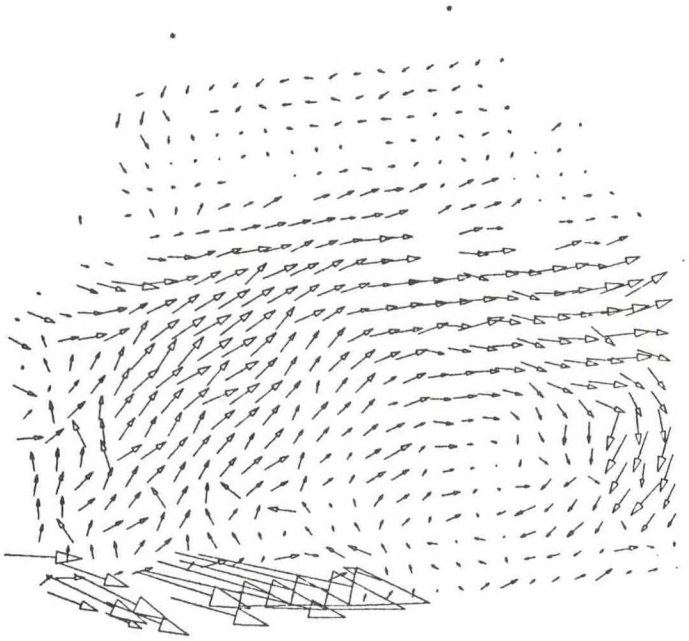
TRUE NORTH ↑



0040 11-OCT-82
0050 11-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0140 11-OCT-82
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TRUE NORTH

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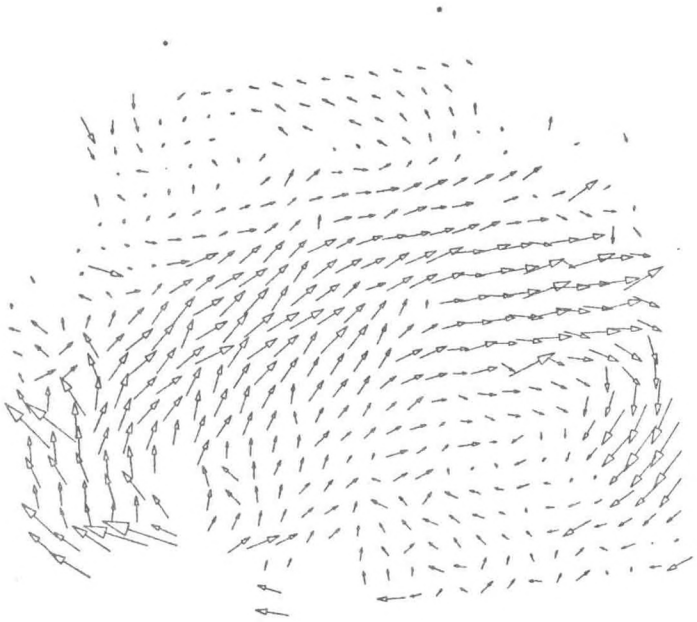
TRUE NORTH



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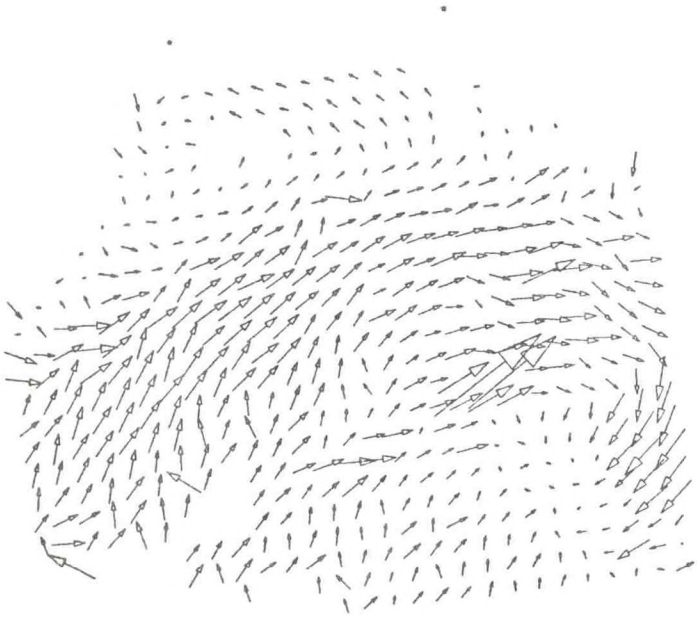

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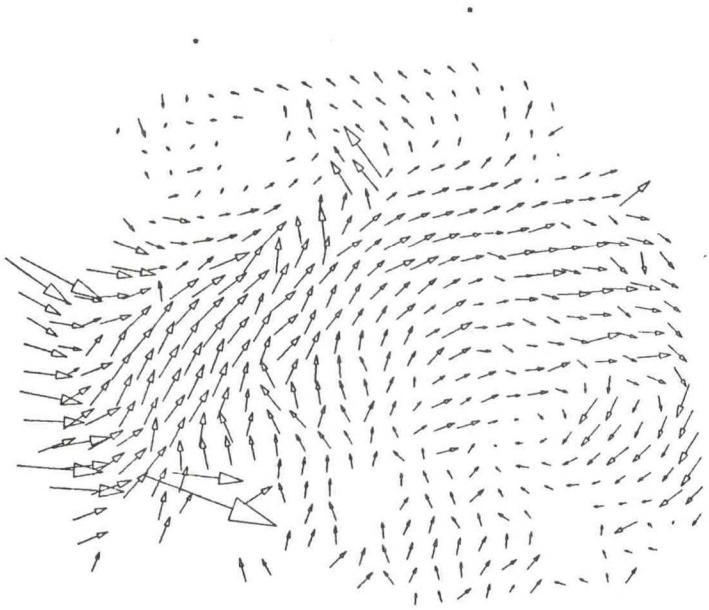

0540 11-OCT-82
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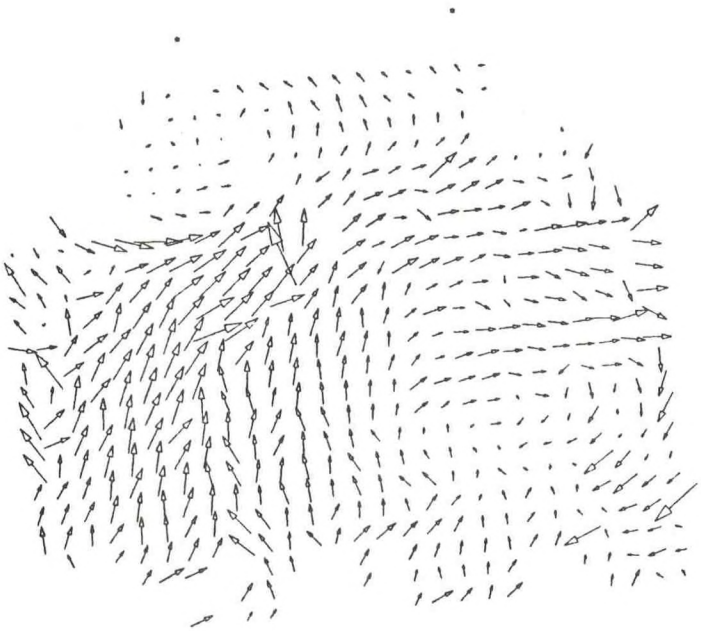
8.0 KM , 200.0 CM/S

TRUE NORTH



0640 11-OCT-82
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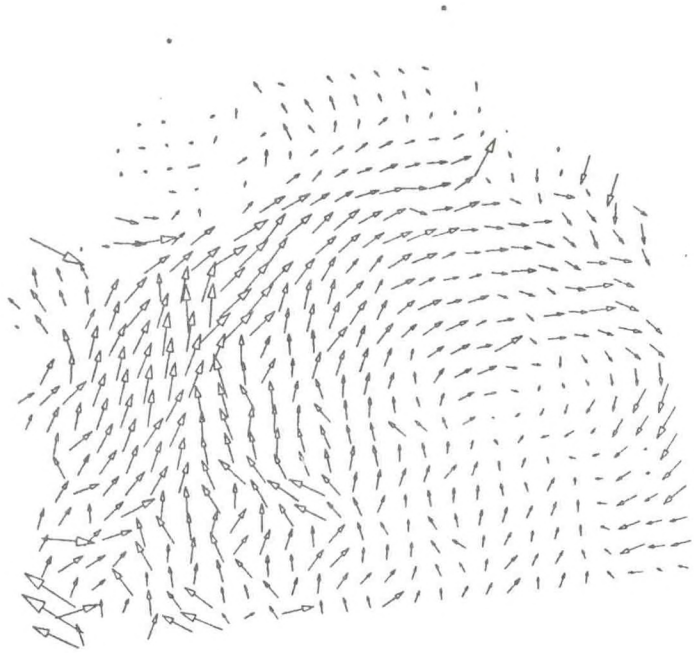
8.0 KM . 200.0 CM/S

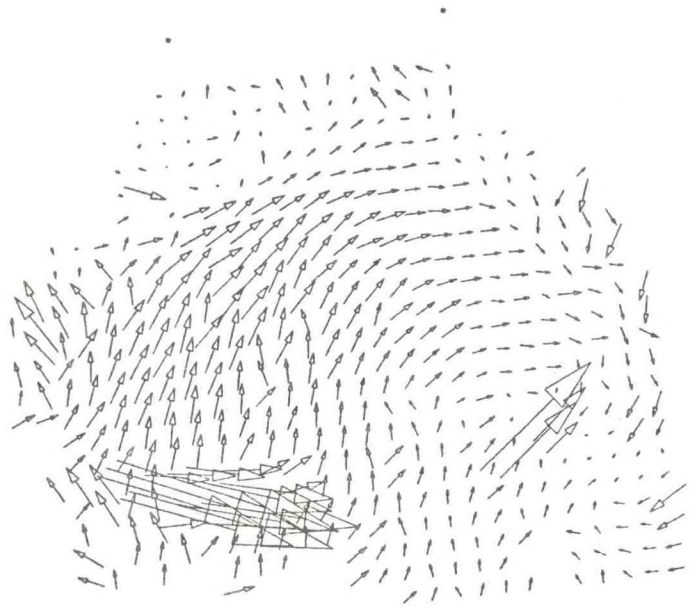
TRUE NORTH ↑



0740 11-OCT-82
0750 11-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH ↑



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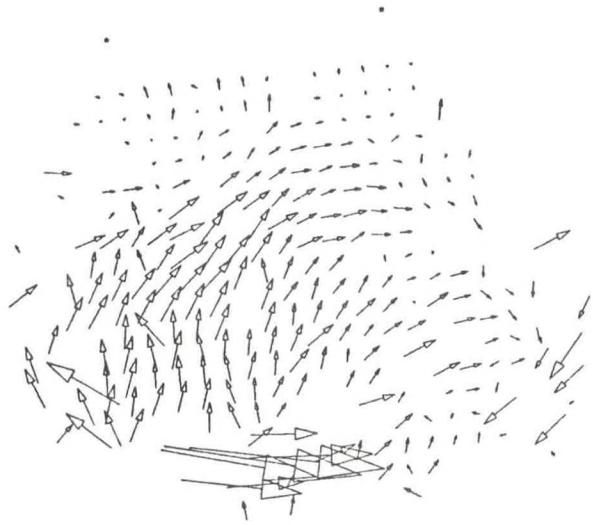

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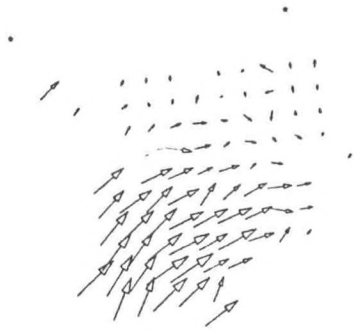
TRUE NORTH



1040 11-OCT-82
1050 11*OCT*82

8.0 KM , 200.0 CM/S

TRUE NORTH

1140 11-OCT-82
1150 11*OCT*82

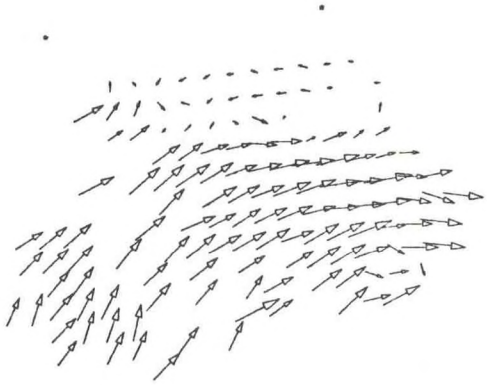
8.0 KM , 200.0 CM/S

TRUE NORTH

1240 11-OCT-82
1250 11-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1340 11-OCT-82
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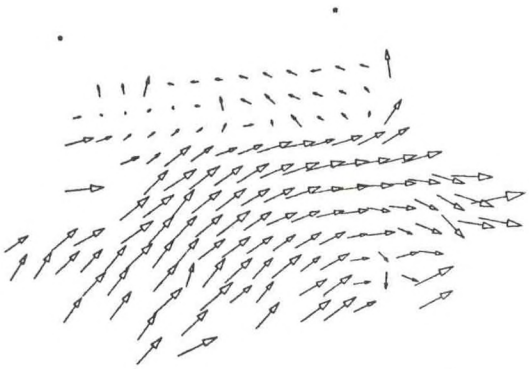

1440 11-OCT-82
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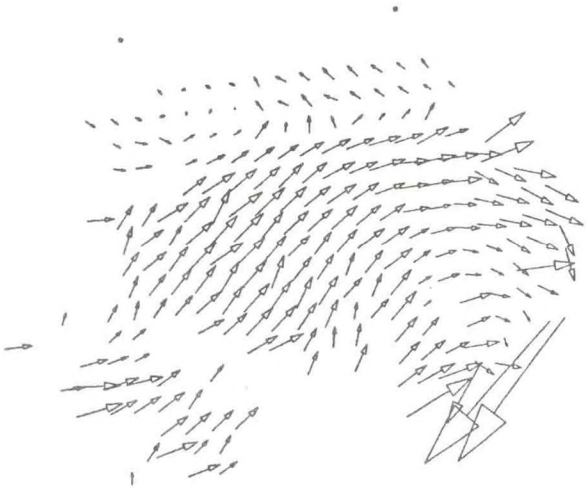

1540 11-OCT-82
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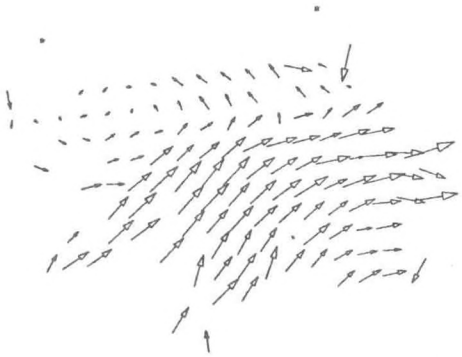
8.0 KM , 200.0 CM/S

TRUE NORTH



1640 11-OCT-82
1650 11-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1740 11-OCT-82
1750 11*OCT*82

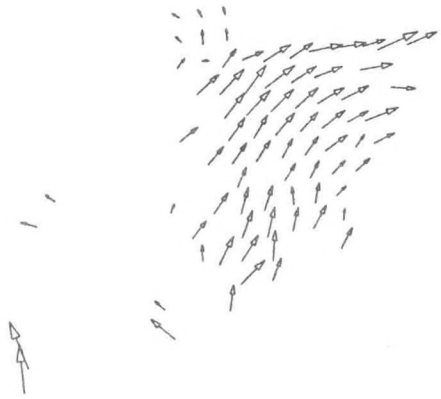
8.0 KM , 200.0 CM/S

TRUE NORTH

1840 11-OCT-82
1850 11-OCT-82

8.0 KM , 200.0 CM/S

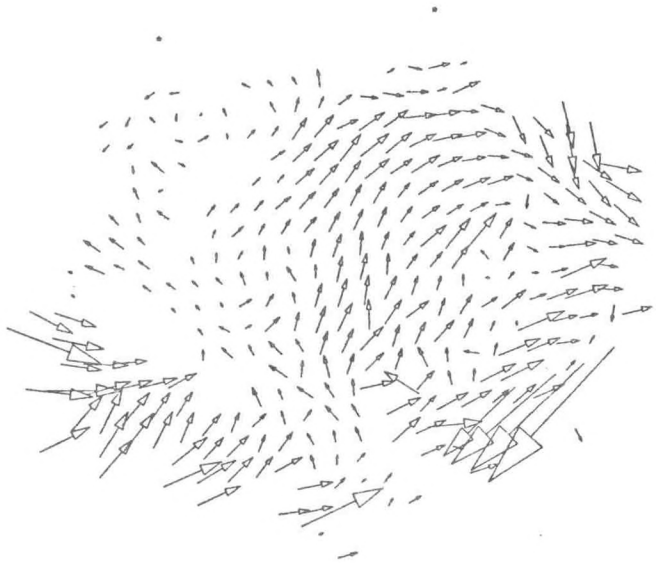
TRUE NORTH



1940 11-OCT-82
1950 11-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



2040 11-OCT-82
2050 11-OCT-82

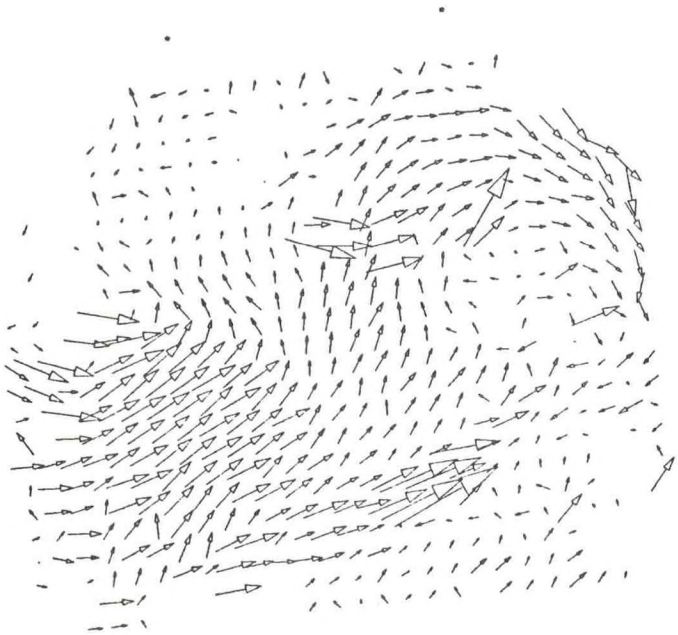
8.0 KM , 200.0 CM/S

TRUE NORTH ↑

2140 11-OCT-82
2150 11-OCT-82

8.0 KM , 200.0 CM/S

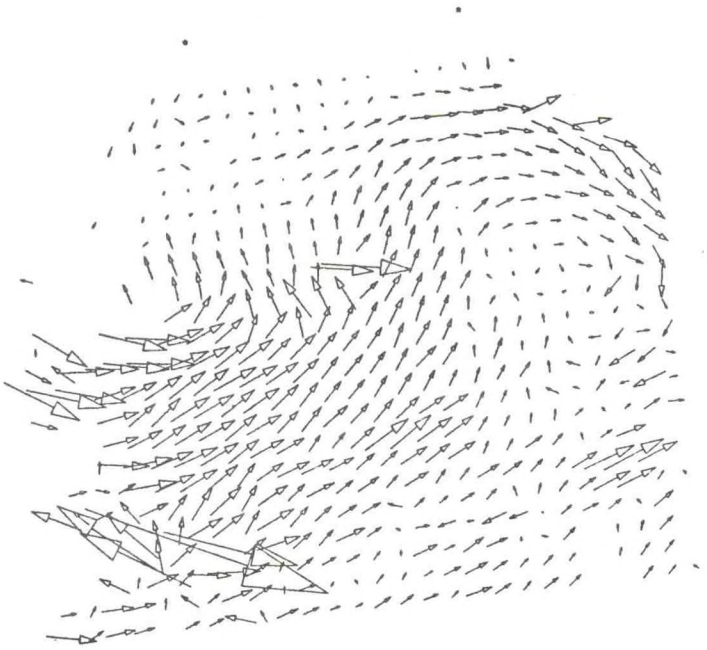
TRUE NORTH ↑



2240 11-OCT-82
2250 11-OCT-82

8.0 KM , 200.0 CM/S

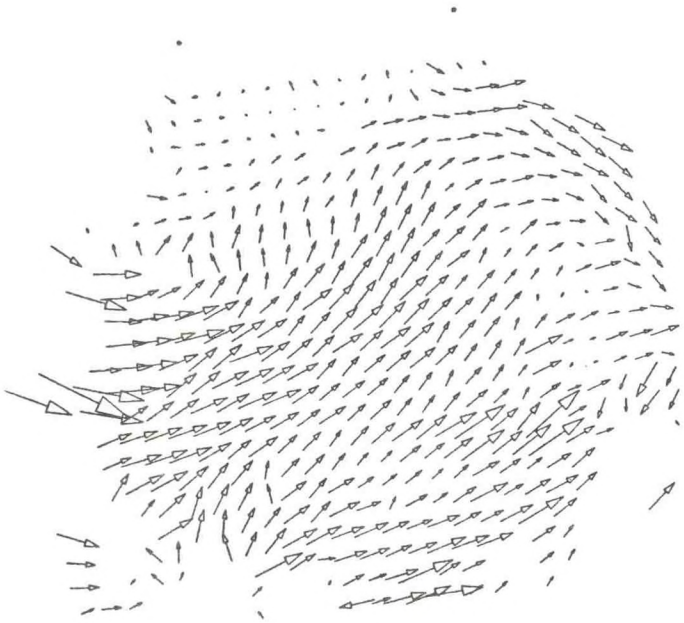
TRUE NORTH



2340 11-OCT-82
2350 11-OCT-82

8.0 KM , 200.0 CM/S

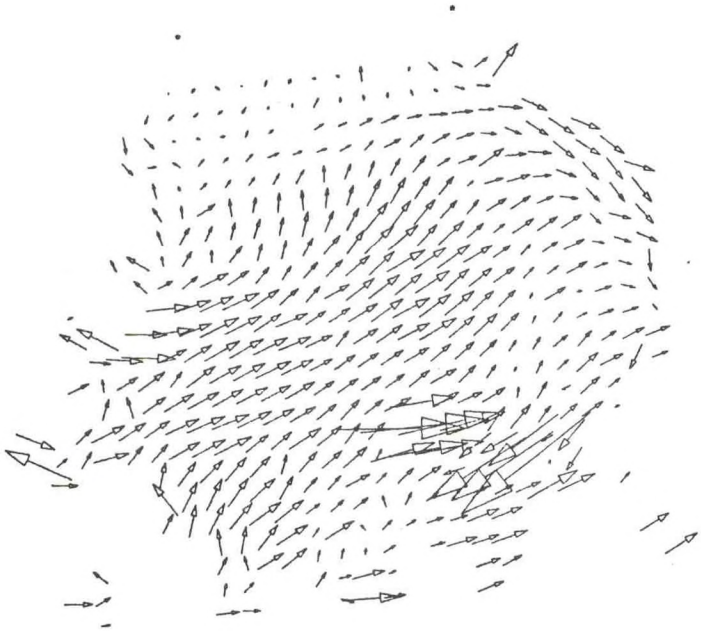
TRUE NORTH



0040 12-OCT-82
0050 12-OCT-82

8.0 KM , 200.0 CM/S

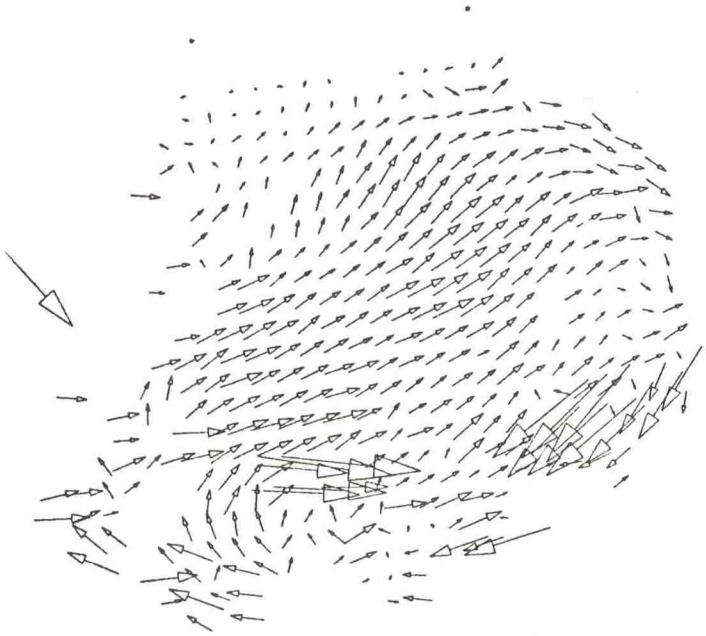
TRUE NORTH



0140 12-OCT-82
0150 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0240 12-OCT-82
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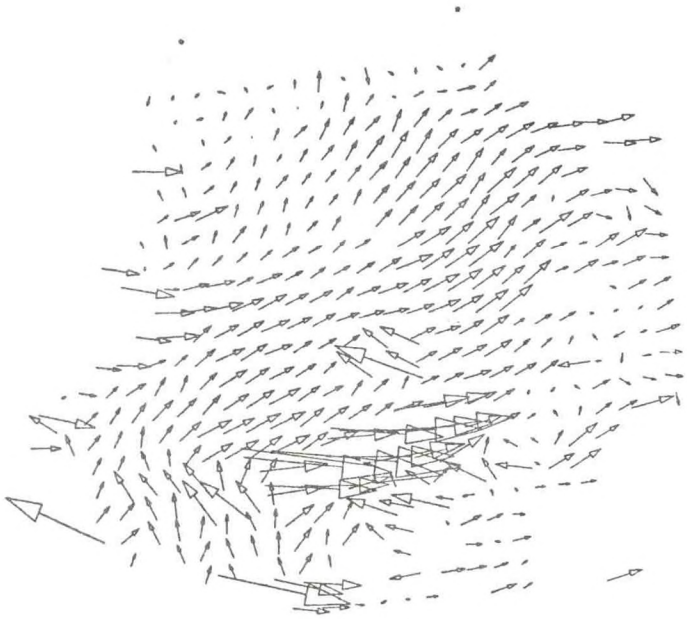
TRUE NORTH



0340 12-OCT-82
0350 12-OCT-82

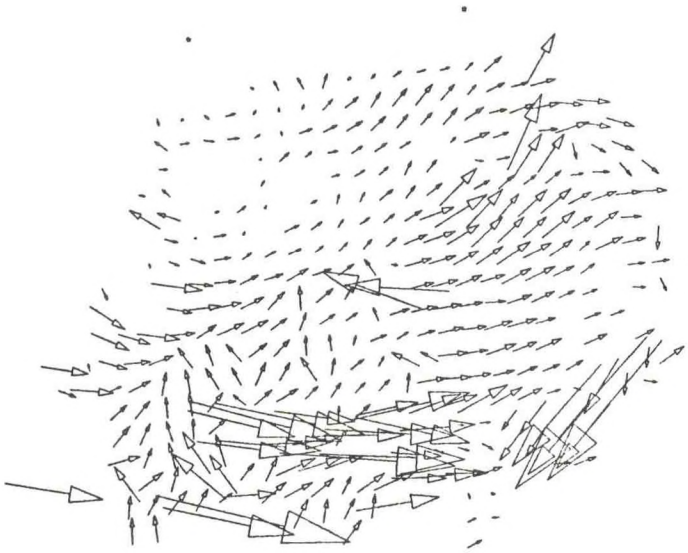
8.0 KM , 200.0 CM/S

TRUE NORTH

0440 12-OCT-82
0450 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0540 12-OCT-82
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8.0 KM , 200.0 CM/S

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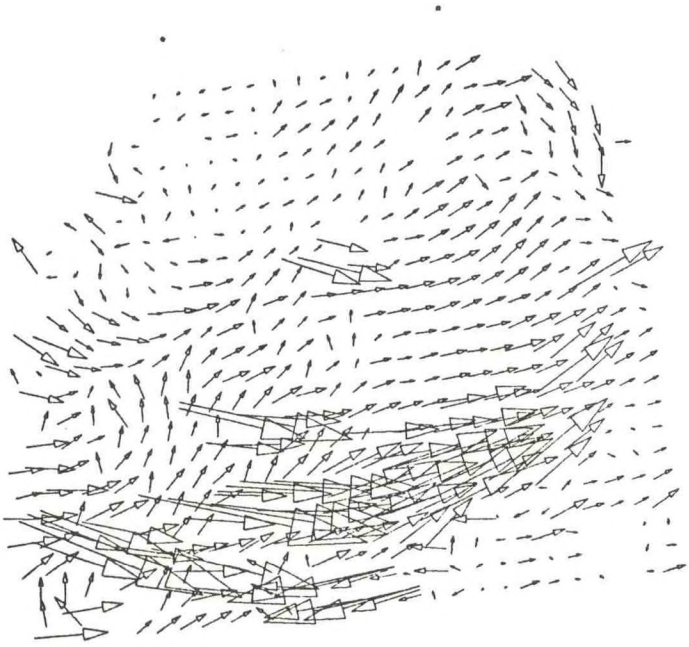

0640 12-OCT-82
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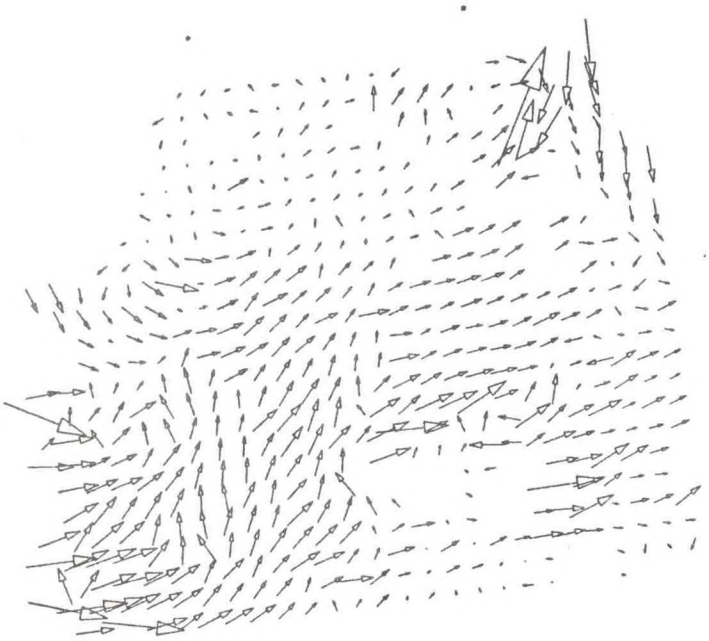
8.0 KM , 200.0 CM/S

TRUE NORTH



0740 12-OCT-82
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8.0 KM , 200.0 CM/S

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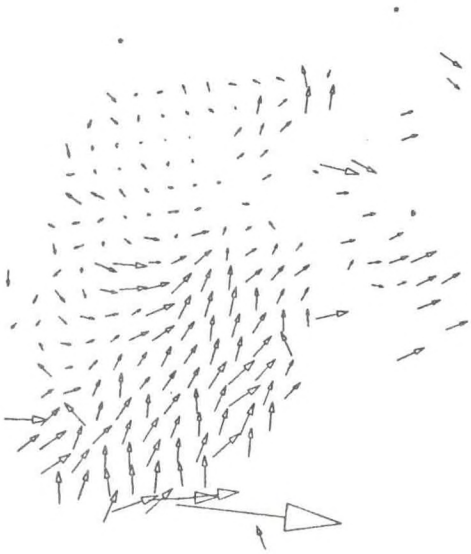
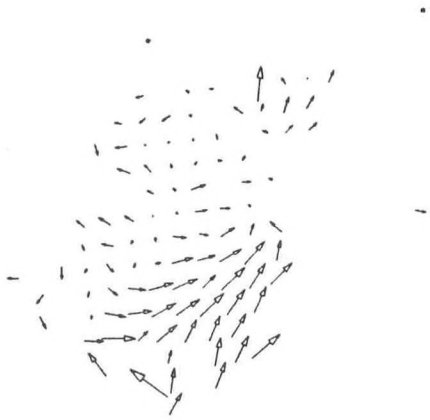


0840 12-OCT-82
0850 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0940 12-OCT-82
0950 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1040 12-OCT-82
1050 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1140 12-OCT-82
1150 12-OCT-82

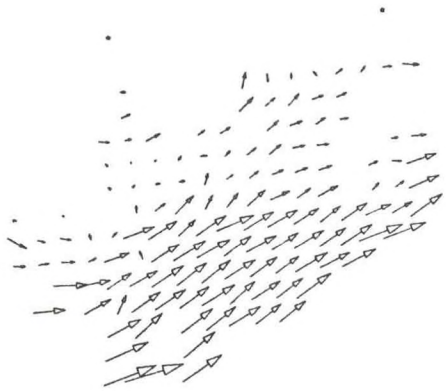
8.0 KM , 200.0 CM/S

TRUE NORTH

1240 12-OCT-82
1250 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1340 12-OCT-82
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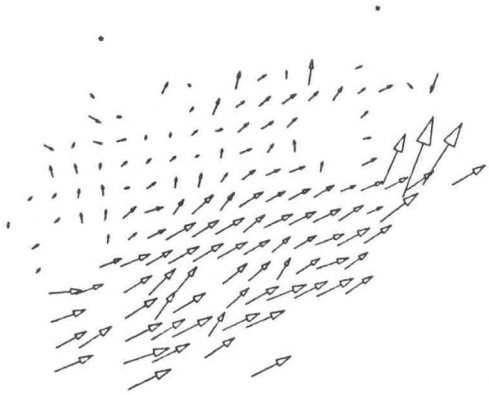
8.0 KM , 200.0 CM/S

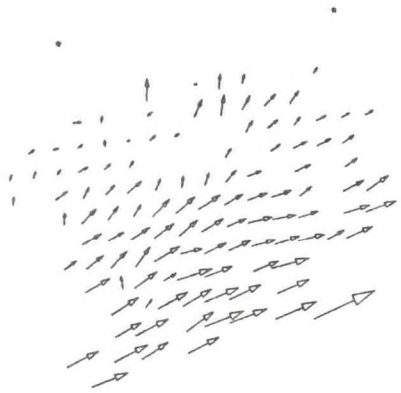
TRUE NORTH



1440 12-OCT-82
1450 12-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



1540 12-OCT-82
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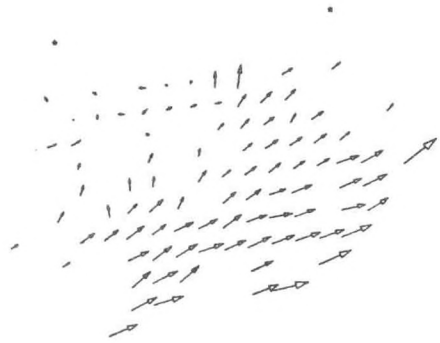
8.0 KM . 200.0 CM/S

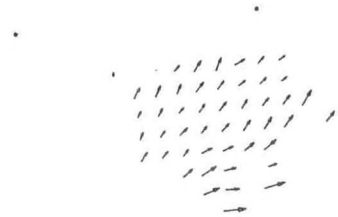
TRUE NORTH



1640 12-OCT-82
1650 12-OCT-82

8.0 KM , 200.0 CM/S

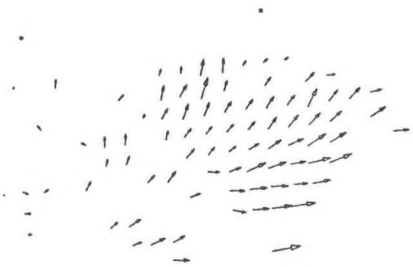
TRUE NORTH



1740 12-OCT-82
1750 12-OCT-82

8.0 KM , 200.0 CM/S

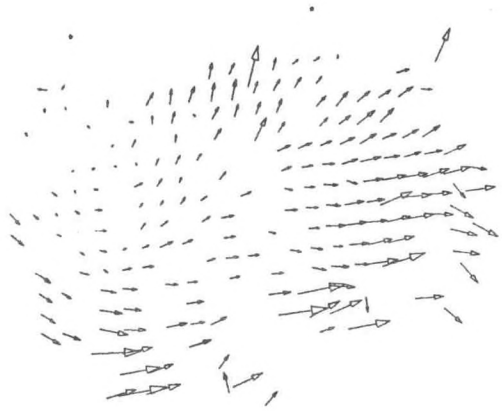
TRUE NORTH



1840 12-OCT-82
1850 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1940 12-OCT-82
1950 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

2040 12-OCT-82
2050 12*OCT*82

8.0 KM . 200.0 CM/S

TRUE NORTH

2140 12-OCT-82
2150 12*OCT*82

8.0 KM . 200.0 CM/S

TRUE NORTH

2240 12-OCT-82
2250 12-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH

2340 12-OCT-82
2350 12-OCT-82

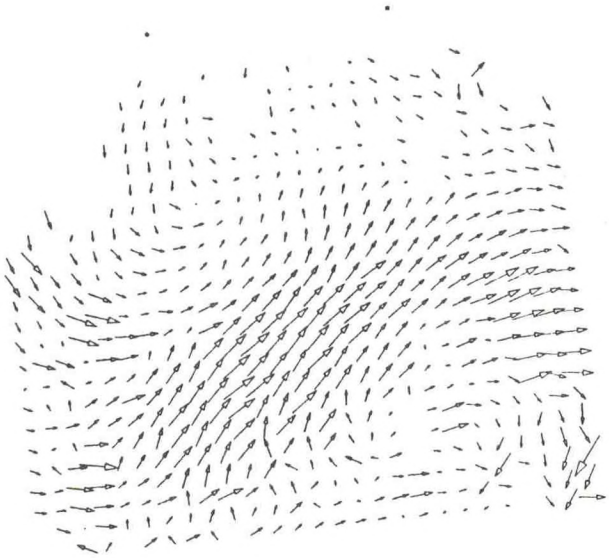
8.0 KM . 200.0 CM/S

TRUE NORTH

0040 13-OCT-82
0050 13-OCT-82

8.0 KM , 200.0 CM/S

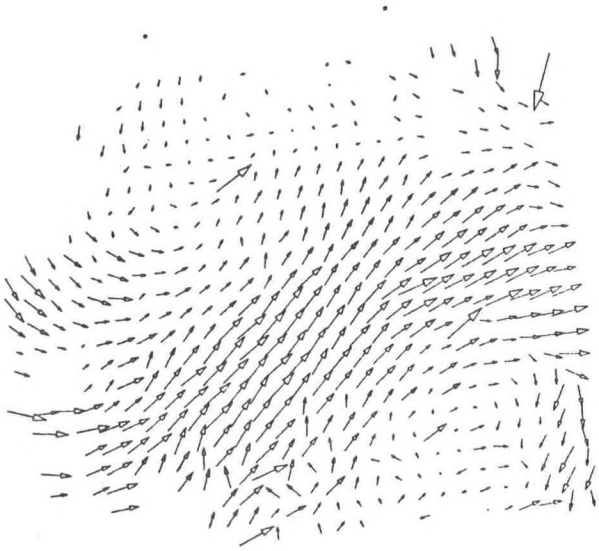
TRUE NORTH



0140 13-OCT-82
0150 13-OCT-82

8.0 KM , 200.0 CM/S

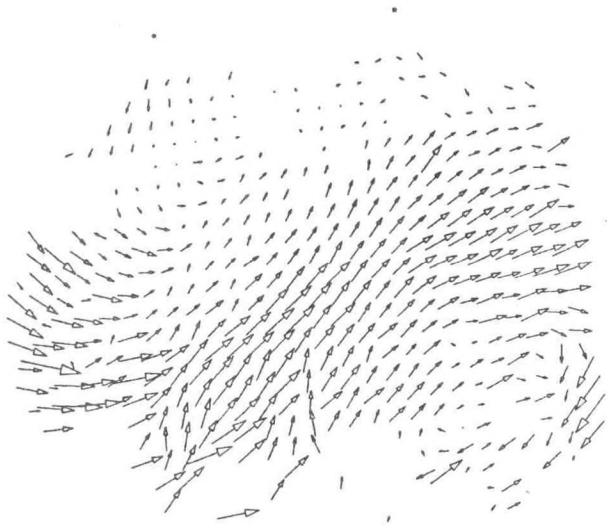
TRUE NORTH



0240 13-OCT-82
0250 13-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



0340 13-OCT-82
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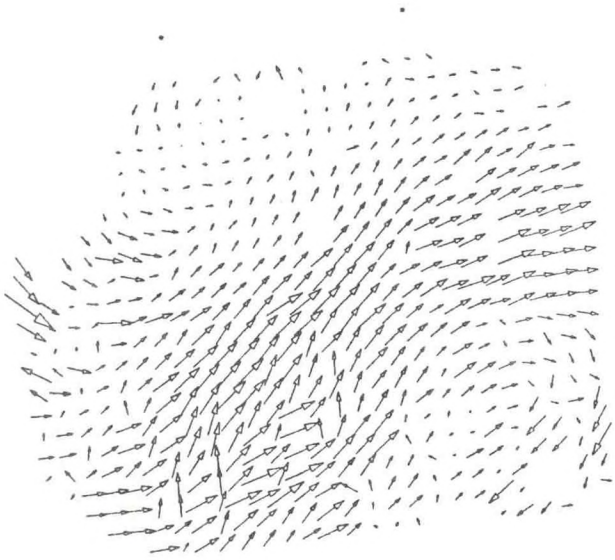
8.0 KM . 200.0 CM/S

TRUE NORTH



0440 13-OCT-82
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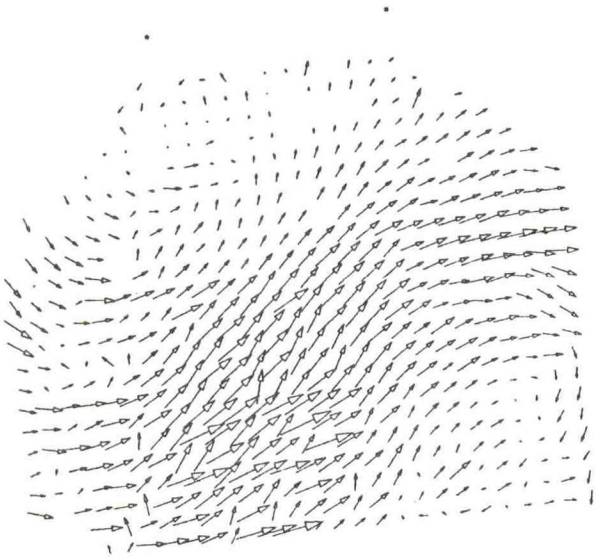
8.0 KM , 200.0 CM/S

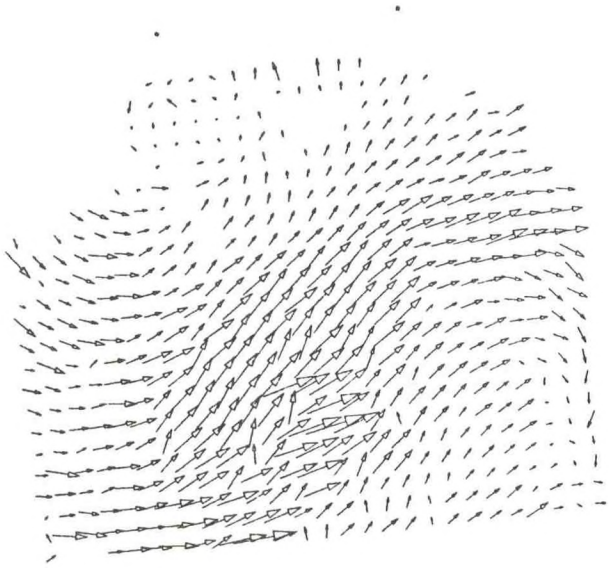
TRUE NORTH



0540 13-OCT-82
0550 13-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0640 13-OCT-82
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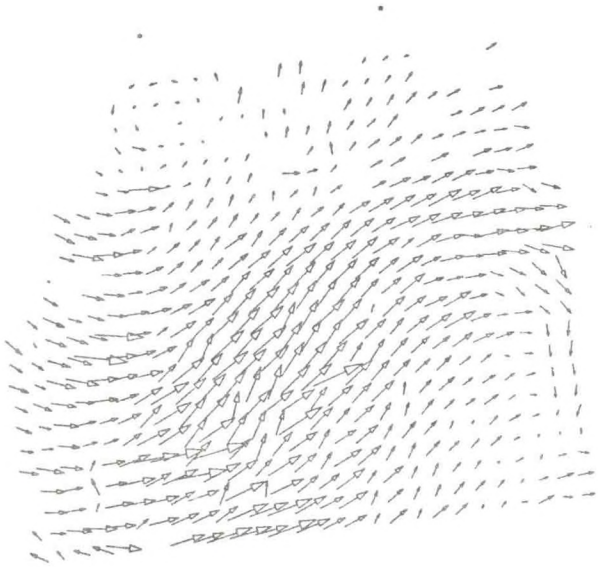
8.0 KM . 200.0 CM/S

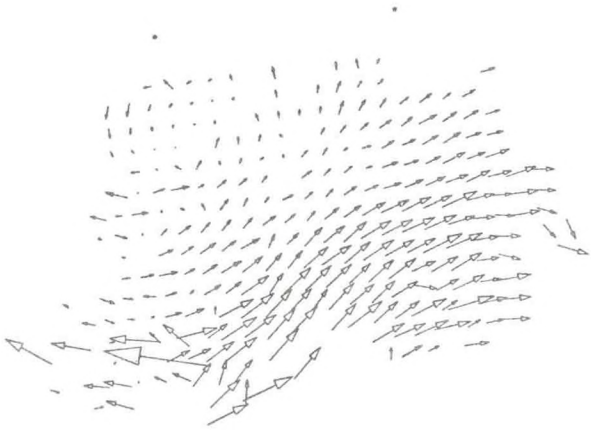
TRUE NORTH



0740 13-OCT-82
0750 13-OCT-82

8.0 KM . 200.0 CM/S

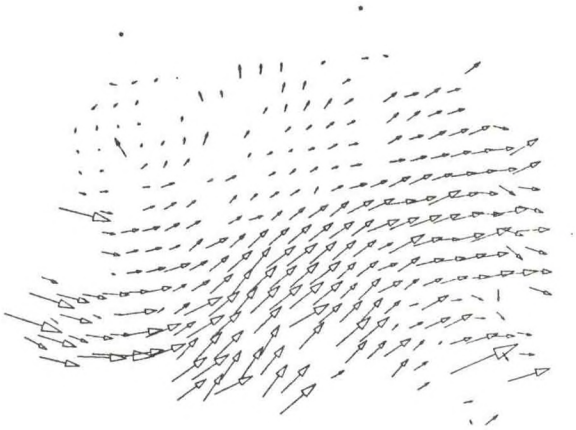
TRUE NORTH



0840 13-OCT-82
0850 13-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0940 13-OCT-82
0950 13-OCT-82

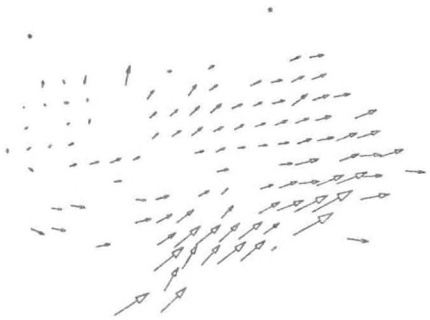
8.0 KM , 200.0 CM/S

TRUE NORTH

1040 13-OCT-82
1050 13-OCT-82

8.0 KM , 200.0 CM/S

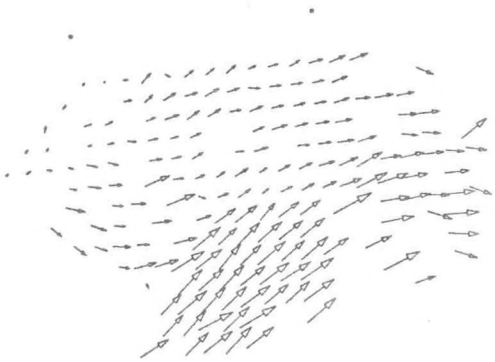
TRUE NORTH



1140 13-OCT-82
1150 13-OCT-82

8.0 KM , 200.0 CM/S

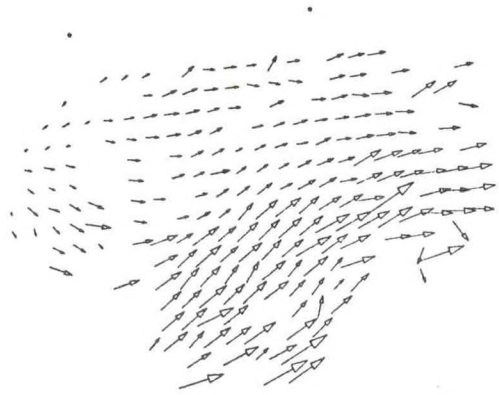
TRUE NORTH



1240 13-OCT-82
1250 13-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1340 13-OCT-82
1350 13-OCT-82

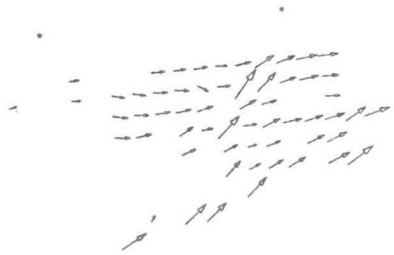
8.0 KM , 200.0 CM/S

TRUE NORTH

1440 13-OCT-82
1450 13-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



1540 13-OCT-82
1550 13-OCT-82

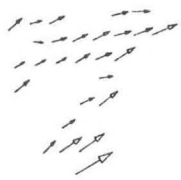
8.0 KM . 200.0 CM/S

TRUE NORTH

1640 13-OCT-82
1650 13-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



1740 13-OCT-82
1750 13-OCT-82

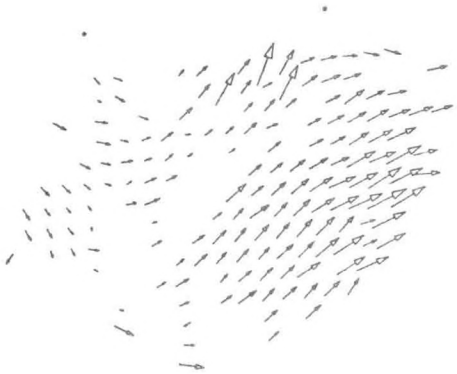
8.0 KM . 200.0 CM/S

TRUE NORTH

1840 13-OCT-82
1850 13-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1940 13-OCT-82
1950 13-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

2040 13-OCT-82
2050 13-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

2140 13-OCT-82
2150 13-OCT-82

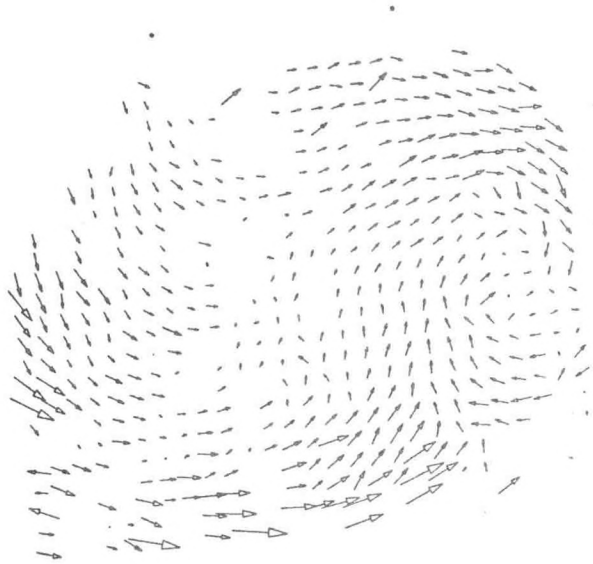
8.0 KM , 200.0 CM/S

TRUE NORTH

2240 13-OCT-82
2250 13-OCT-82

8.0 KM , 200.0 CM/S

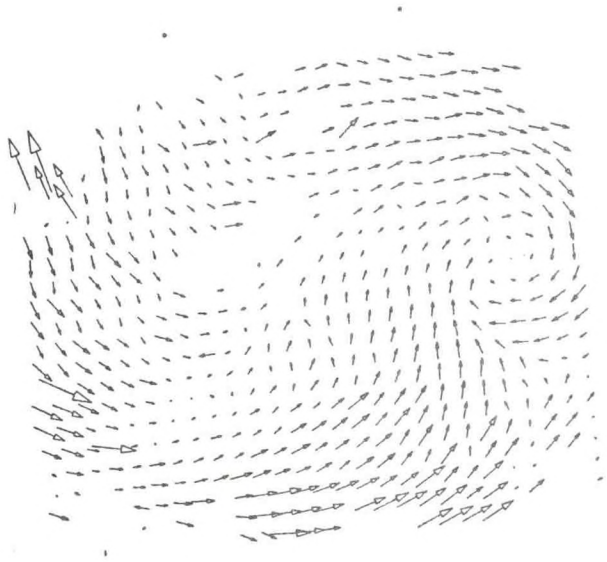
TRUE NORTH ↑



2340 13-OCT-82
2350 13-OCT-82

8.0 KM , 200.0 CM/S

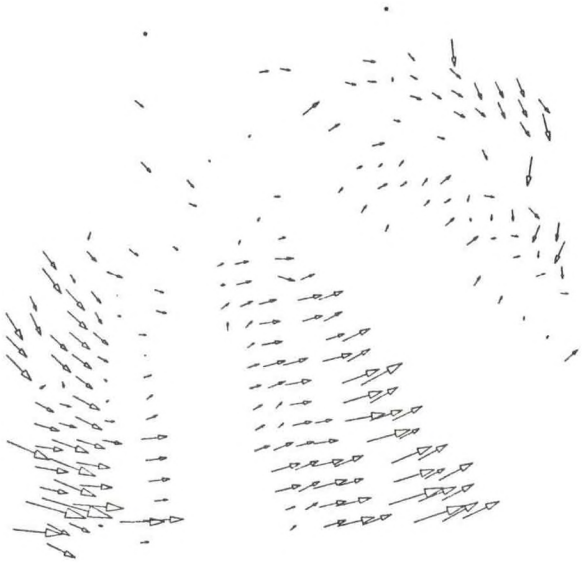
TRUE NORTH ↑



0040 14-OCT-82
0050 14-OCT-82

8.0 KM . 200.0 CM/S

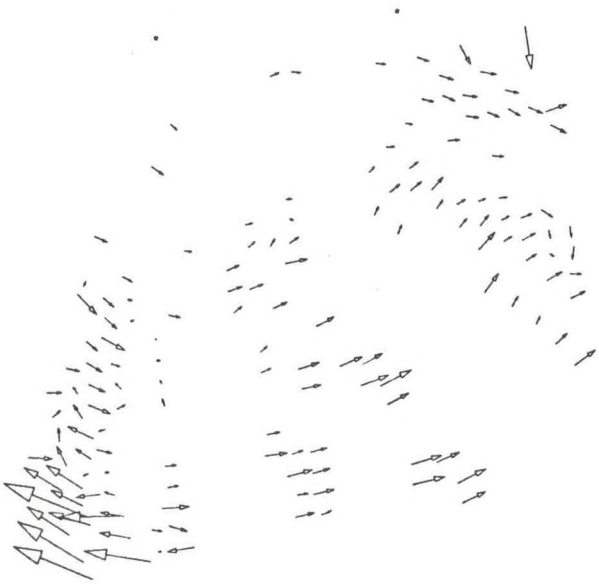
TRUE NORTH



0140 14-OCT-82
0150 14-OCT-82

8.0 KM . 200.0 CM/S

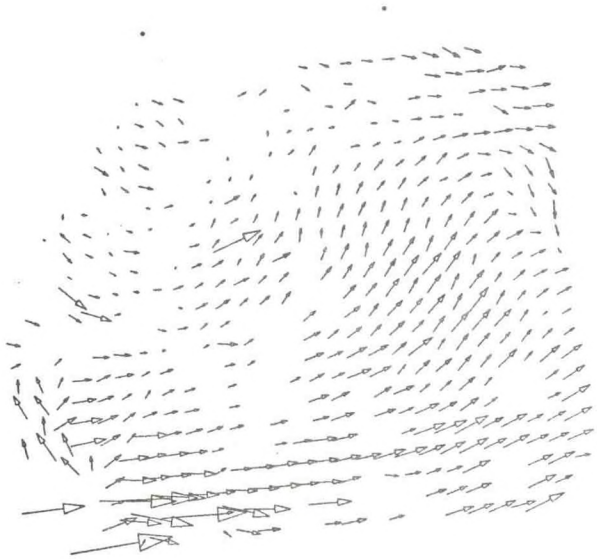
TRUE NORTH



0240 14-OCT-82
0250 14-OCT-82

8.0 KM , 200.0 CM/S

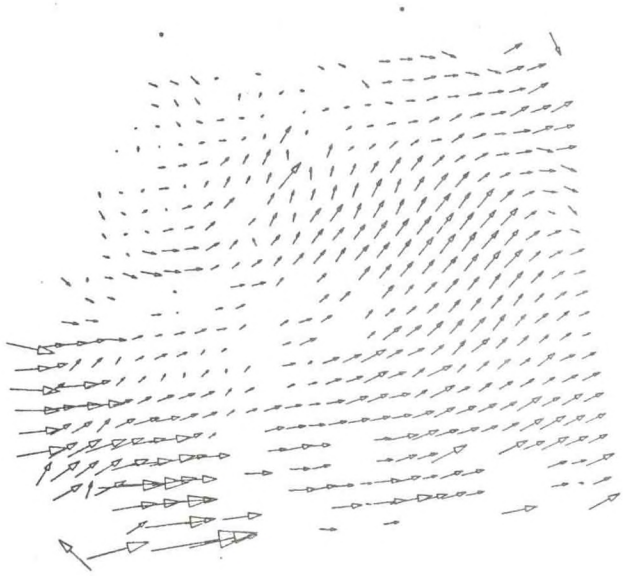
TRUE NORTH



0340 14-OCT-82
0350 14-OCT-82

8.0 KM , 200.0 CM/S

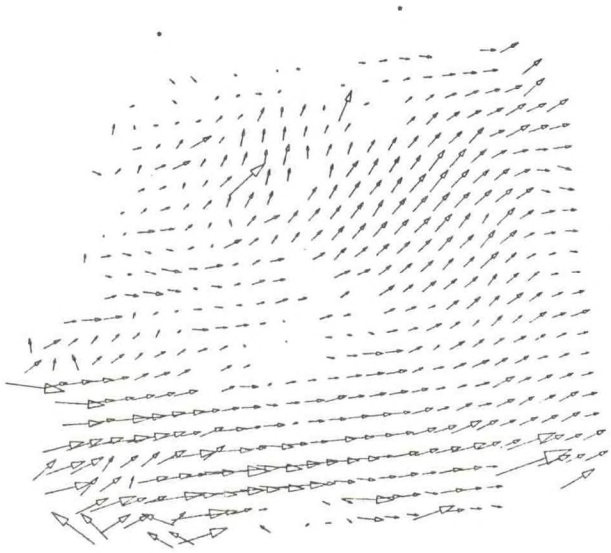
TRUE NORTH



0440 14-OCT-82
0450 14-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0540 14-OCT-82
0550 14-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

0640 14-OCT-82
0650 14*OCT*82

8.0 KM , 200.0 CM/S

TRUE NORTH

0740 14-OCT-82
0750 14*OCT*82

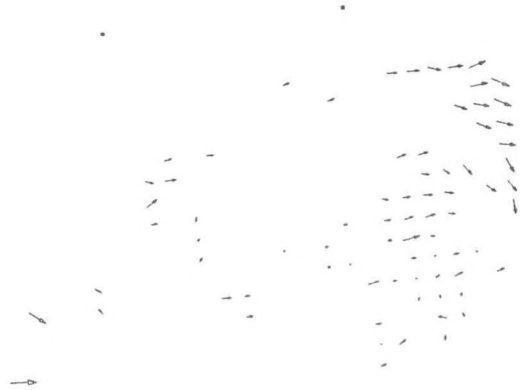
8.0 KM , 200.0 CM/S

TRUE NORTH

0840 14-OCT-82
0850 14-OCT-82

8.0 KM , 200.0 CM/S

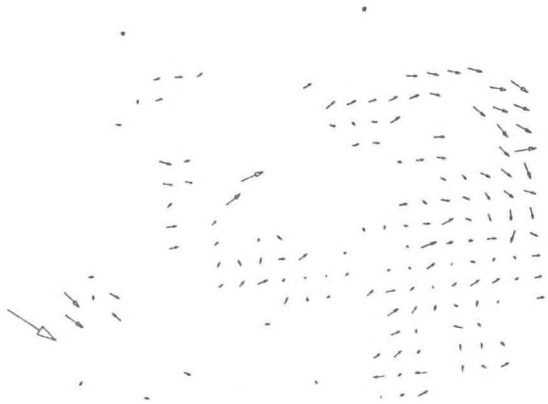
TRUE NORTH

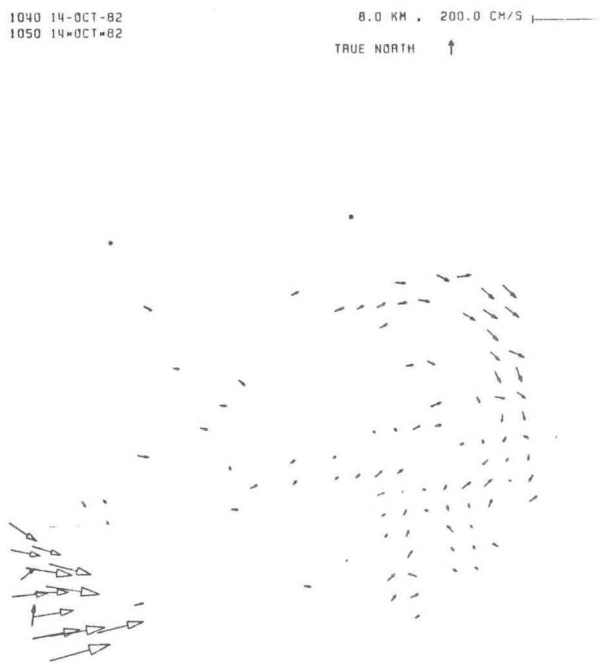


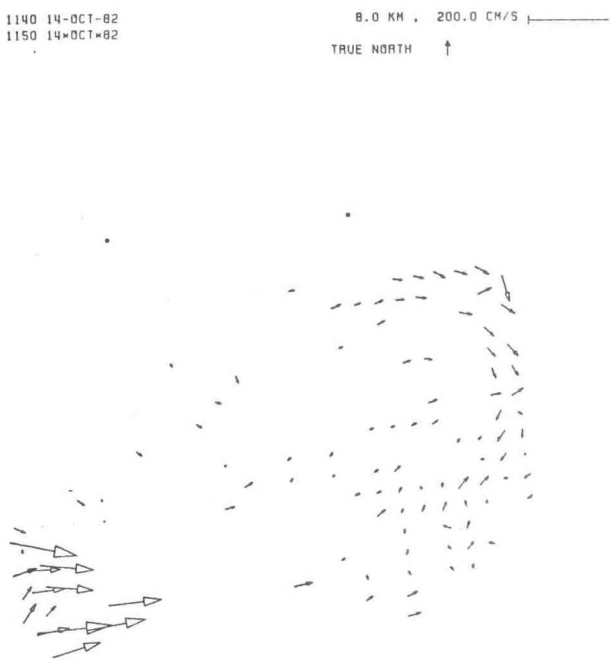
0940 14-OCT-82
0950 14-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



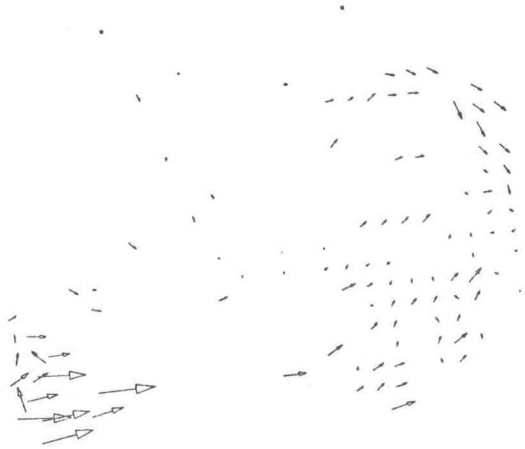

1040 14-OCT-82
1050 14*OCT*82
8.0 KM , 200.0 CM/S
TRUE NORTH


1140 14-OCT-82
1150 14*OCT*82
8.0 KM , 200.0 CM/S
TRUE NORTH

1240 14-OCT-82
1250 14-OCT-82

8.0 KM , 200.0 CM/S

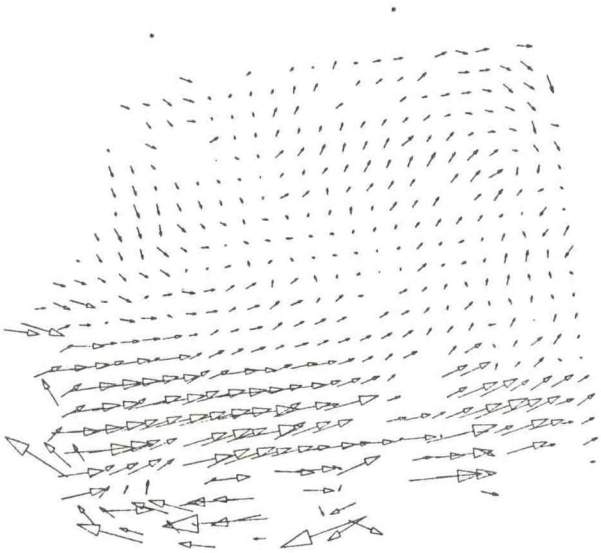
TRUE NORTH ↑



1340 14-OCT-82
1350 14-OCT-82

8.0 KM , 200.0 CM/S

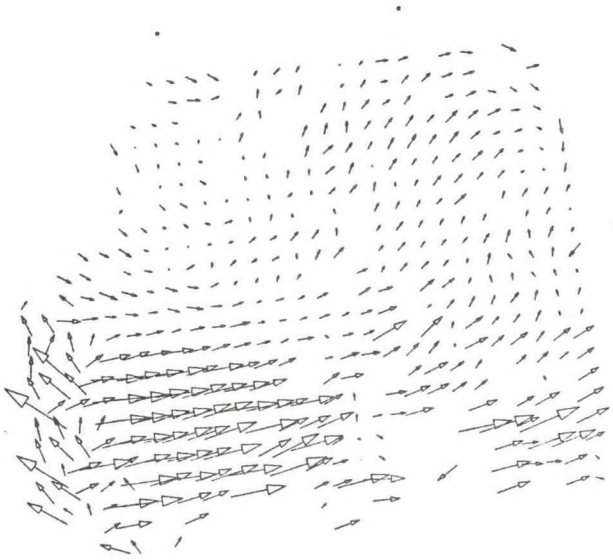
TRUE NORTH ↑



1440 14-OCT-82
1450 14-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1540 14-OCT-82
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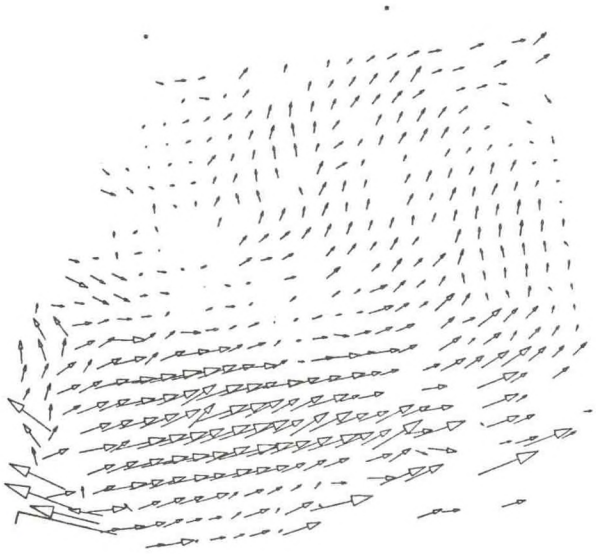
8.0 KM , 200.0 CM/S

TRUE NORTH



1640 14-OCT-82
1650 14-OCT-82

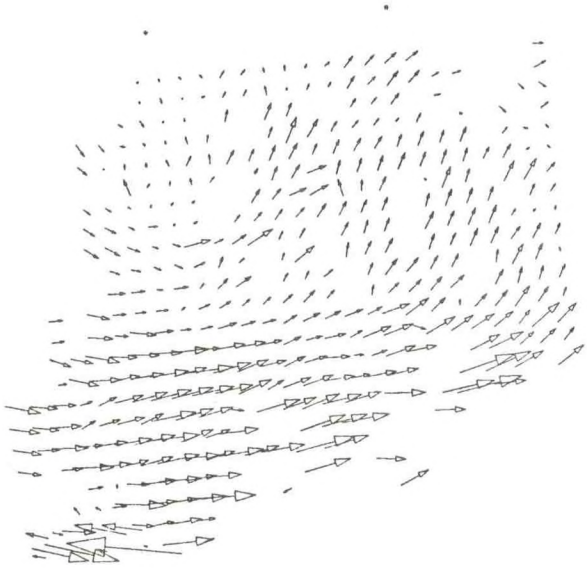
8.0 KM . 200.0 CM/S

TRUE NORTH

1740 14-OCT-82
1750 14-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



1840 14-OCT-82
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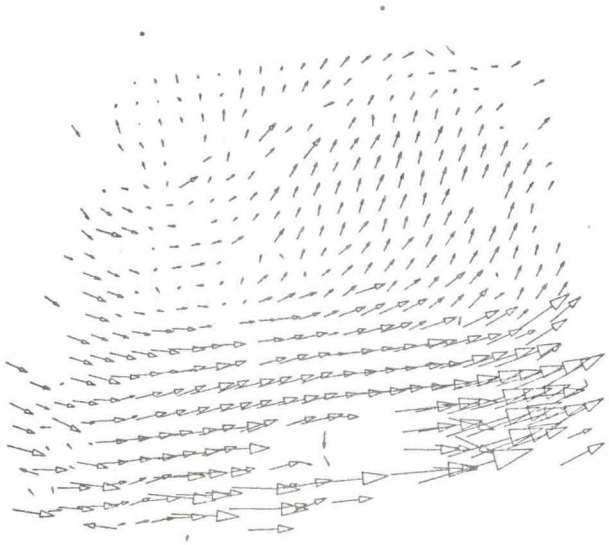
8.0 KM , 200.0 CM/S

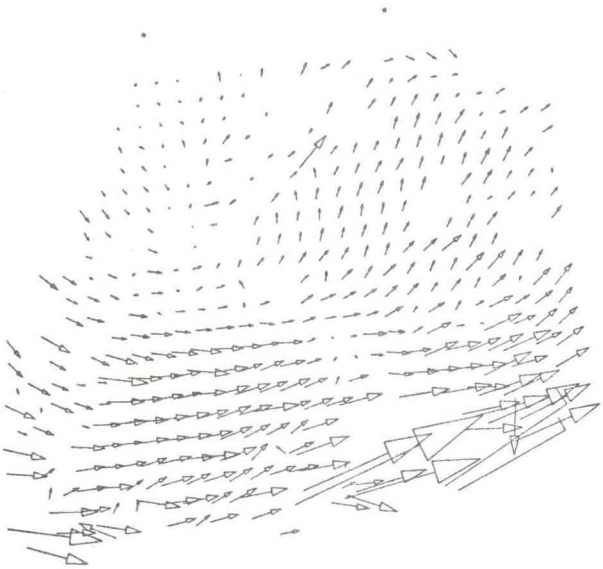
TRUE NORTH



1940 14-OCT-82
1950 14-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



2040 14-OCT-82
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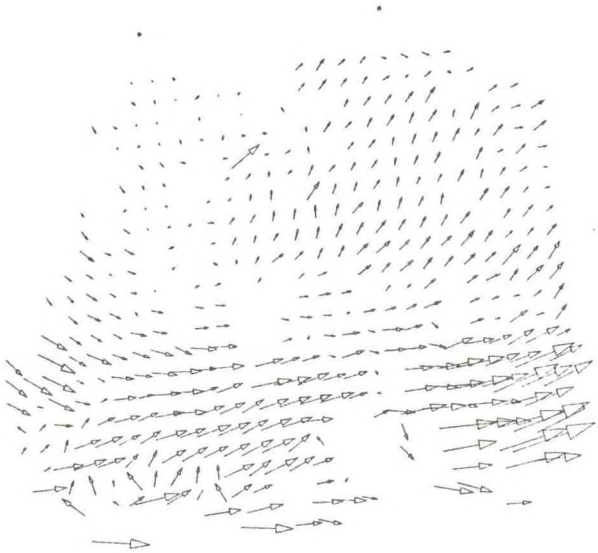
8.0 KM , 200.0 CM/S

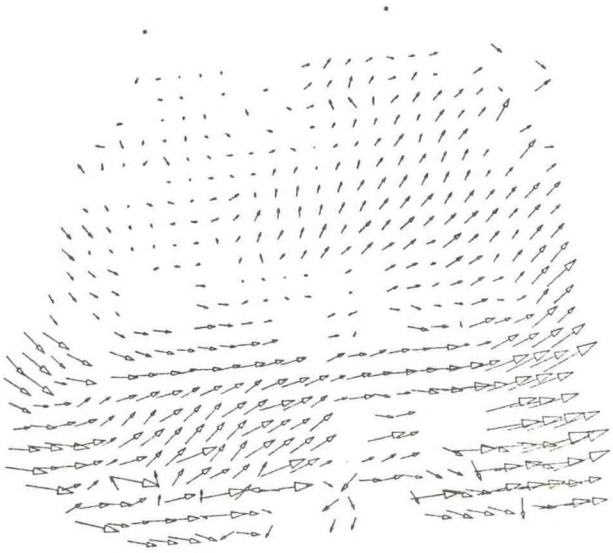
TRUE NORTH



2140 14-OCT-82
2150 14-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



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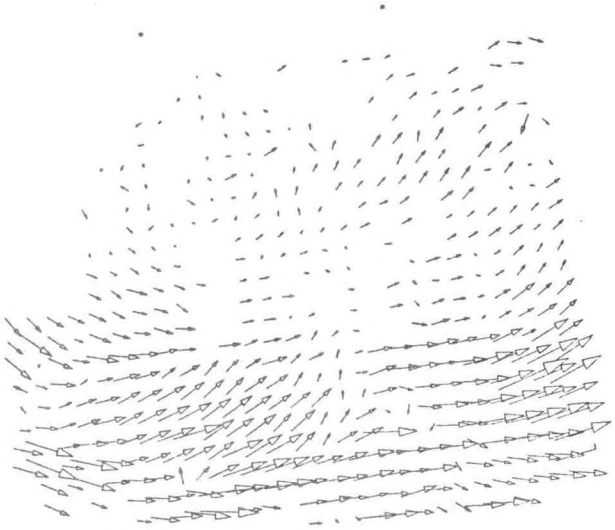
8.0 KM , 200.0 CM/S

TRUE NORTH



2340 14-OCT-82
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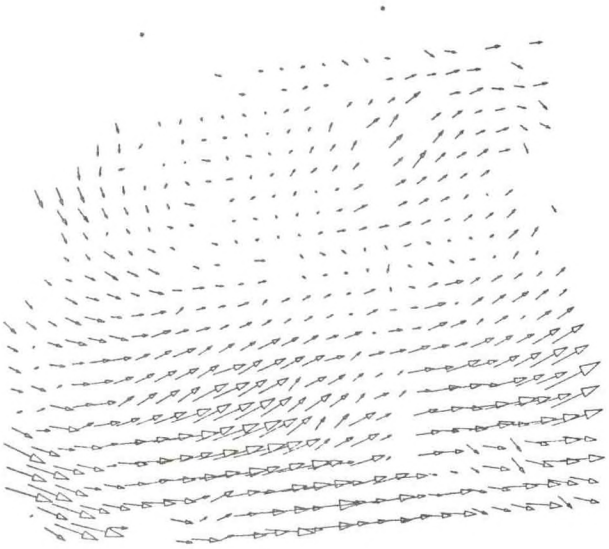
8.0 KM , 200.0 CM/S

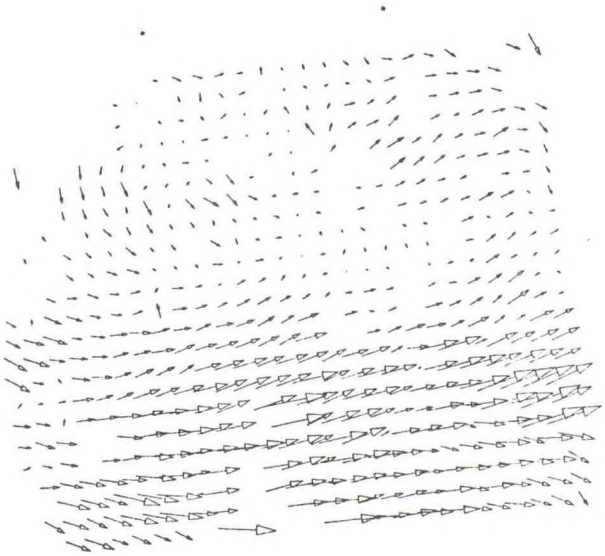
TRUE NORTH



0040 15-OCT-82
0050 15-OCT-82

8.0 KM . 200.0 CM/S

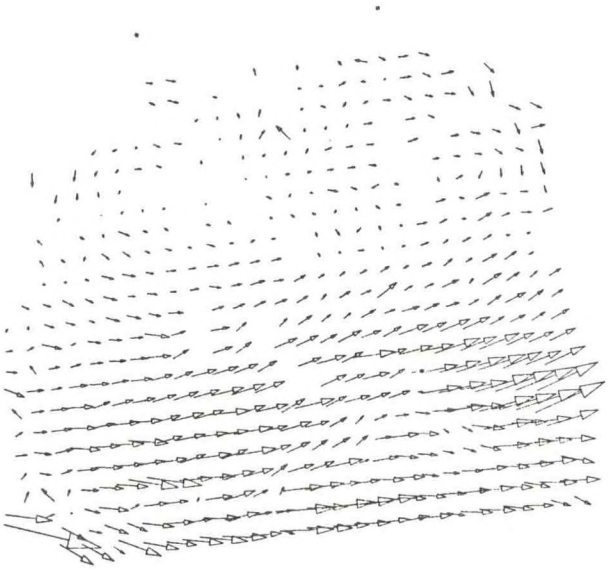
TRUE NORTH ↑



0140 15-OCT-82
0150 15-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH ↑



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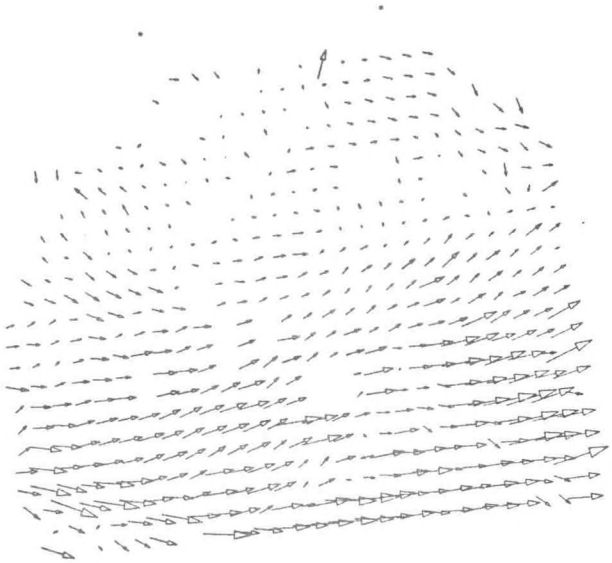
0250 15-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



0340 15-OCT-82
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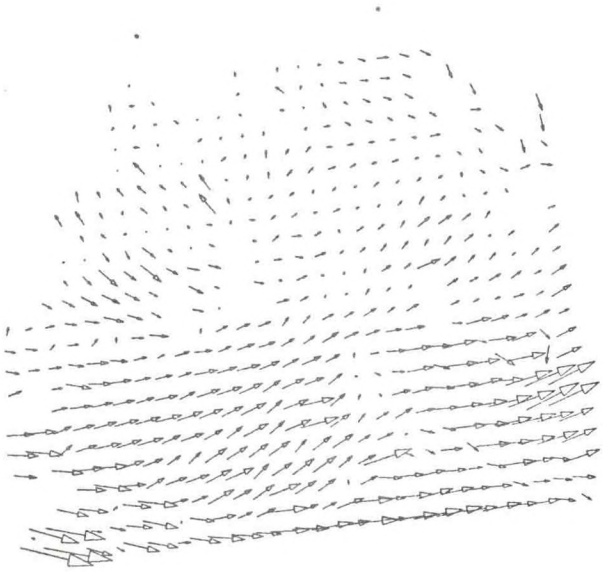
8.0 KM . 200.0 CM/S

TRUE NORTH



0440 15-OCT-82
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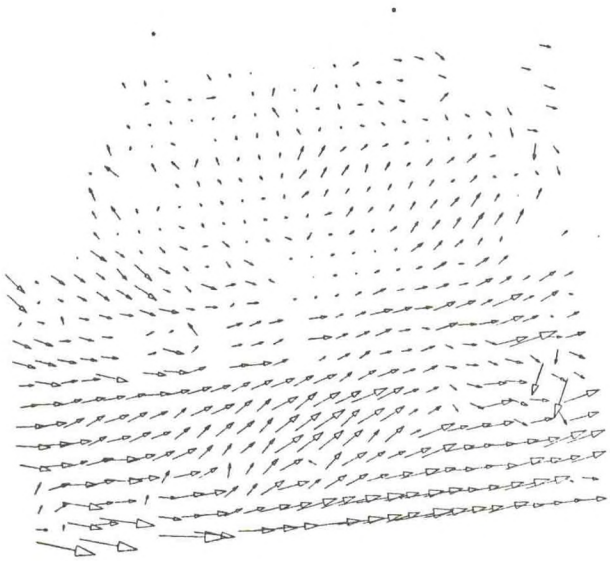
8.0 KM , 200.0 CM/S

TRUE NORTH



0540 15-OCT-82
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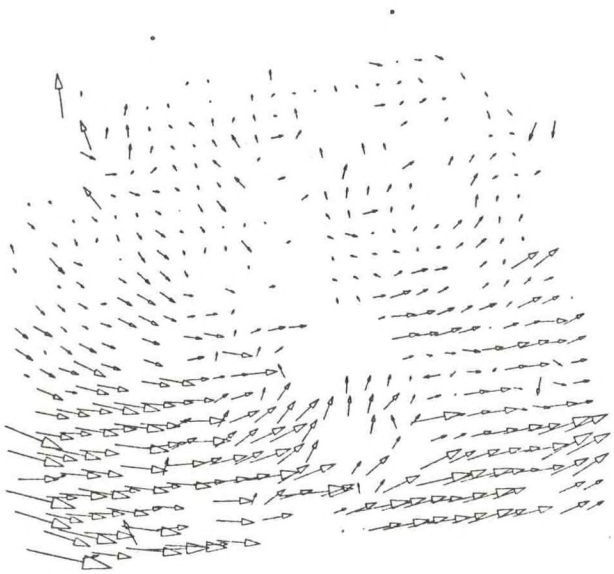
8.0 KM , 200.0 CM/S

TRUE NORTH



0640 15-OCT-82
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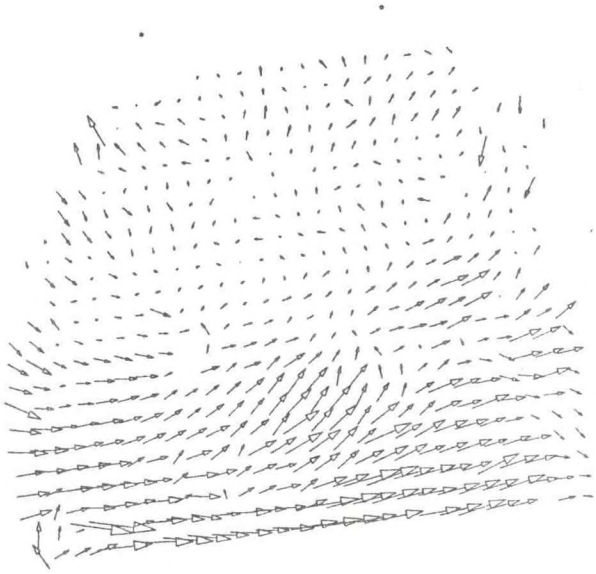
8.0 KM , 200.0 CM/S

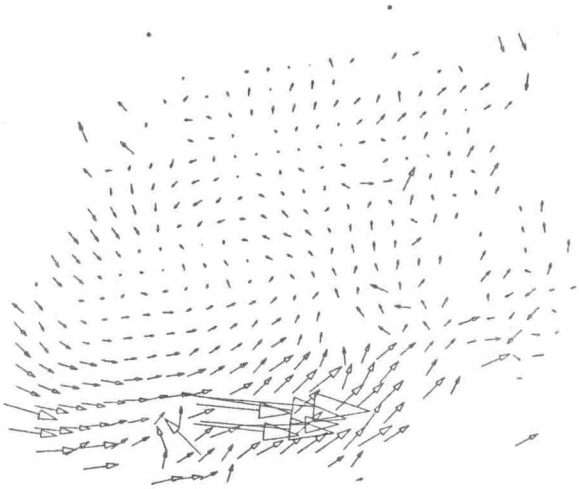
TRUE NORTH ↑



0740 15-OCT-82
0750 15-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑



0840 15-OCT-82
0850 15-OCT-82

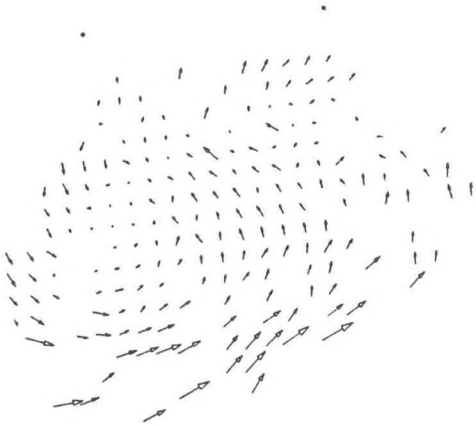
8.0 KM , 200.0 CM/S

TRUE NORTH

0940 15-OCT-82
0950 15-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1040 15-OCT-82
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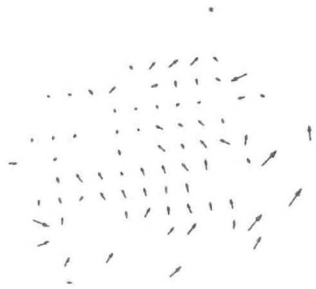
8.0 KM , 200.0 CM/S

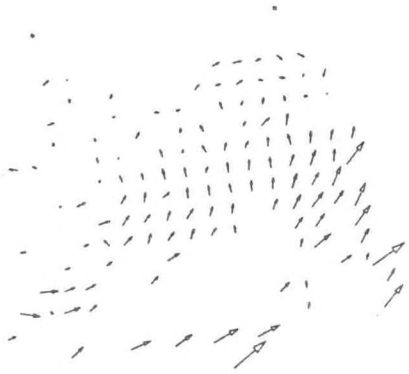
TRUE NORTH



1140 15-OCT-82
1150 15-OCT-82

8.0 KM , 200.0 CM/S

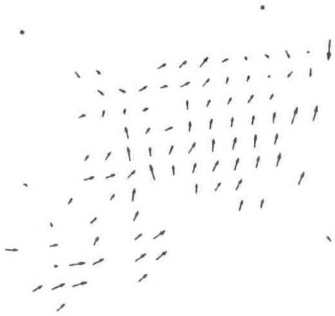
TRUE NORTH



1240 15-OCT-82
1250 15-OCT-82

8.0 KM , 200.0 CM/S

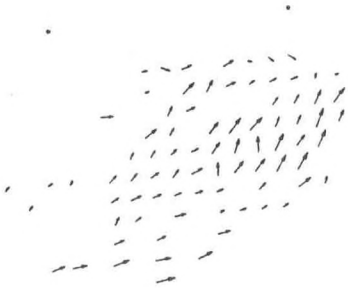
TRUE NORTH



1340 15-OCT-82
1350 15-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1440 15-OCT-82
1450 15-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1540 15-OCT-82
1550 15-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1640 15-OCT-82
1650 15-OCT-82

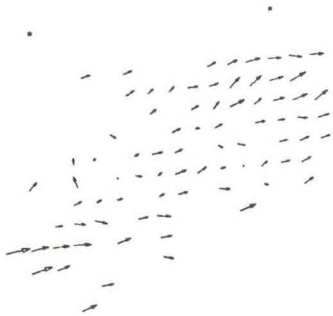
8.0 KM , 200.0 CM/S

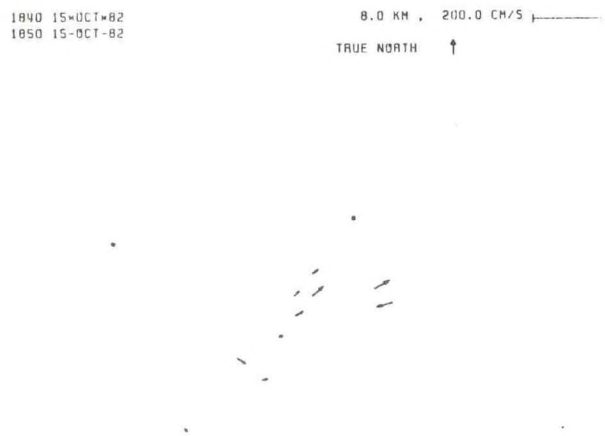
TRUE NORTH

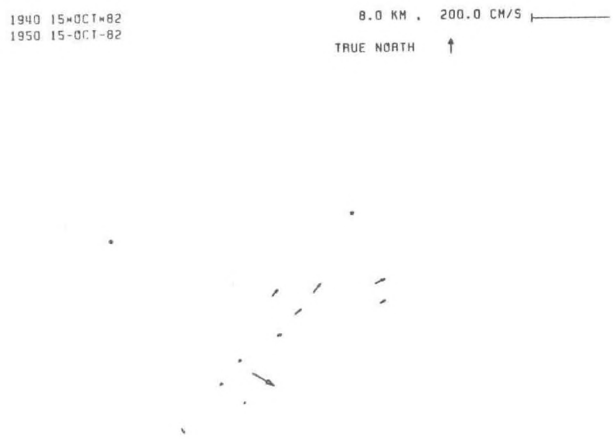
1740 15-OCT-82
1750 15-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



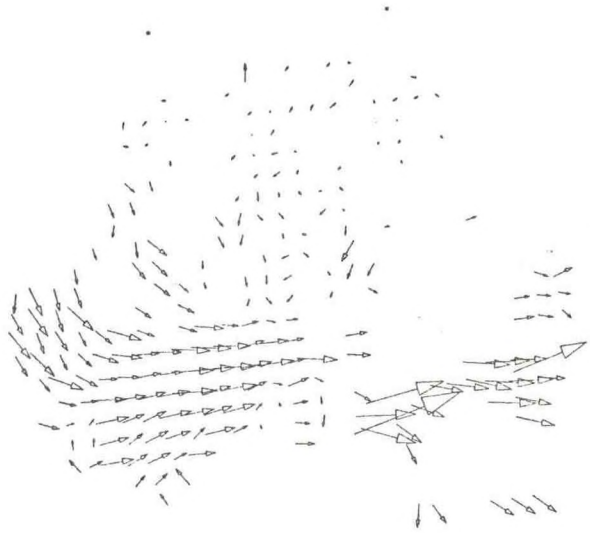

1840 15*OCT*82
1850 15-OCT-82
8.0 KM , 200.0 CM/S
TRUE NORTH


1940 15*OCT*82
1950 15-OCT-82
8.0 KM , 200.0 CM/S
TRUE NORTH

2040 15-OCT-82
2050 15-OCT-82

8.0 KM , 200.0 CM/S

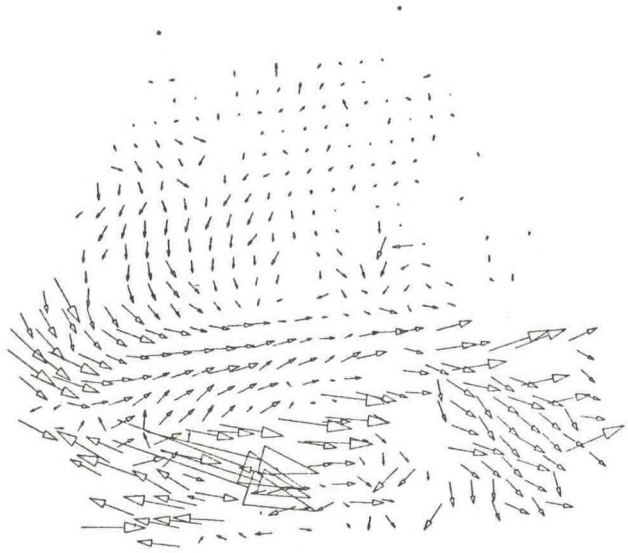
TRUE NORTH



2140 15-OCT-82
2150 15-OCT-82

8.0 KM , 200.0 CM/S

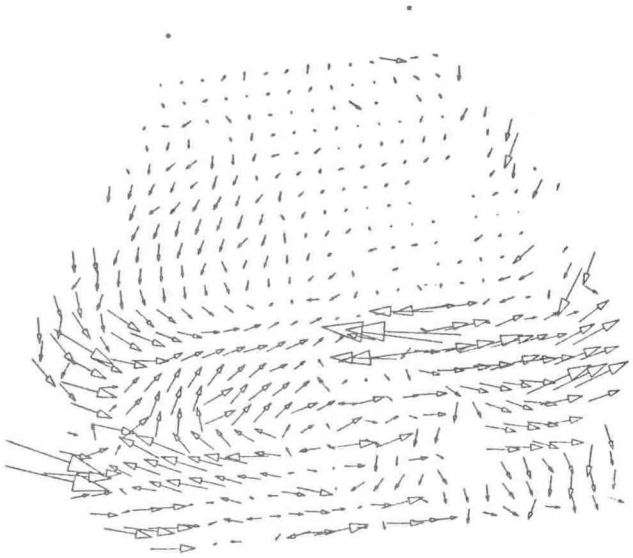
TRUE NORTH



2240 15-OCT-82
2250 15-OCT-82

8.0 KM . 200.0 CM/S

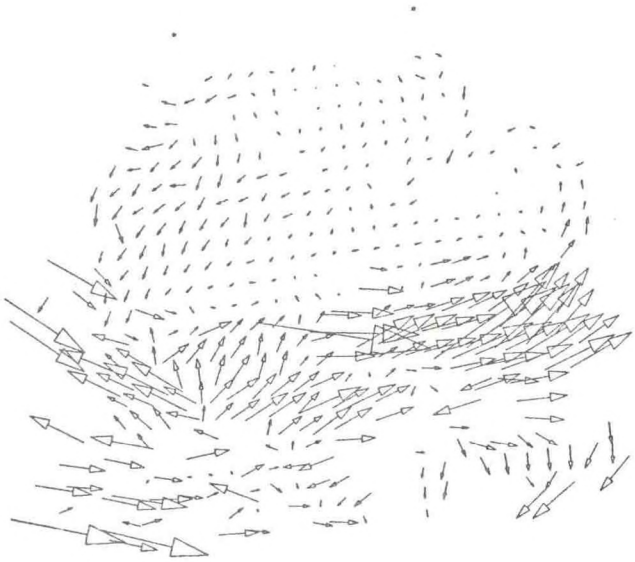
TRUE NORTH



2340 15-OCT-82
2350 15-OCT-82

8.0 KM . 200.0 CM/S

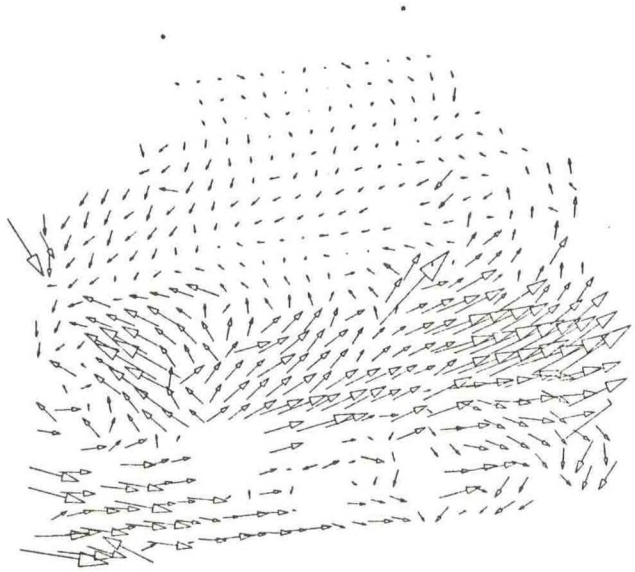
TRUE NORTH



0040 16-OCT-82
0050 16-OCT-82

8.0 KM , 200.0 CM/S

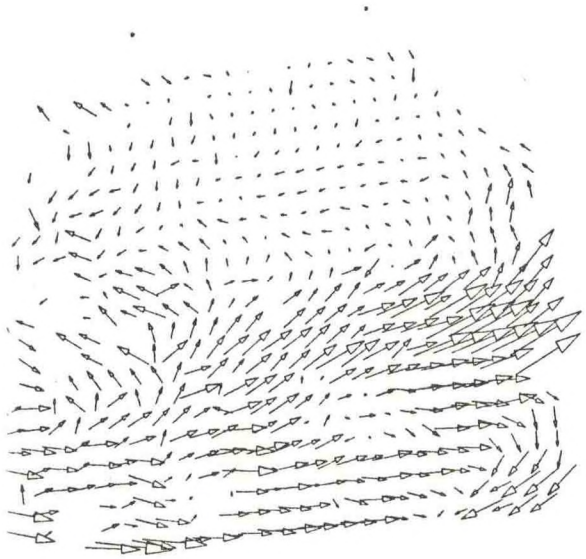
TRUE NORTH



0140 16-OCT-82
0150 16-OCT-82

8.0 KM , 200.0 CM/S

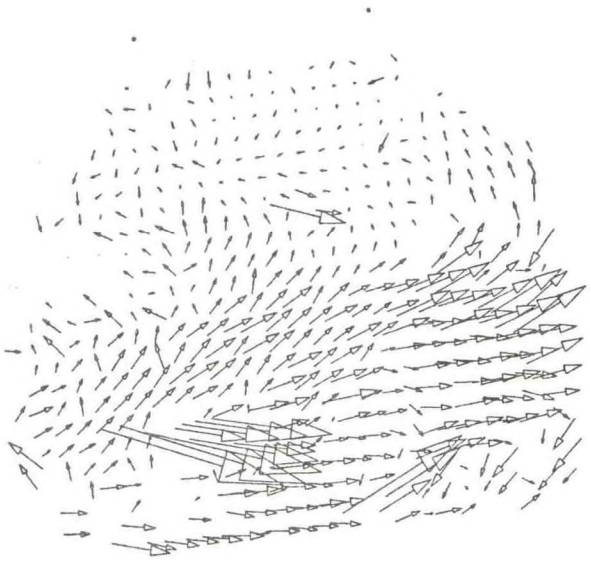
TRUE NORTH



0240 16-OCT-82
0250 16-OCT-82

8.0 KM . 200.0 CM/S

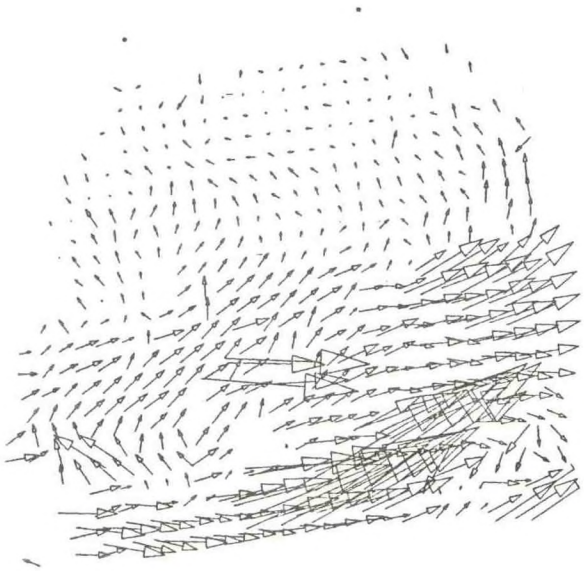
TRUE NORTH



0340 16-OCT-82
0350 16-OCT-82

8.0 KM . 200.0 CM/S

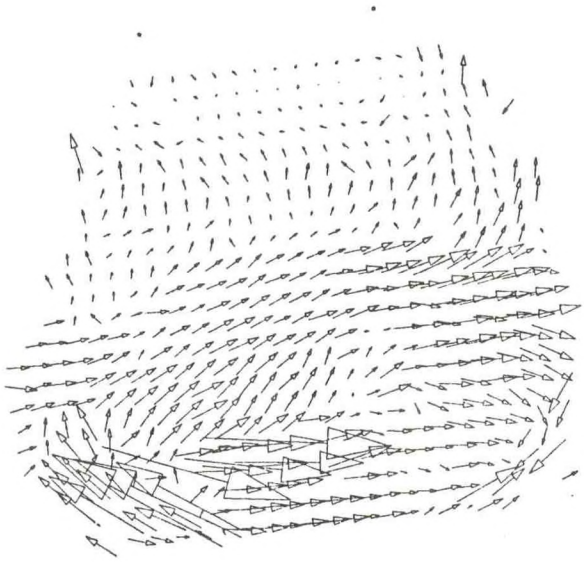
TRUE NORTH



0440 16-OCT-82
0450 16-OCT-82

8.0 KM , 200.0 CM/S

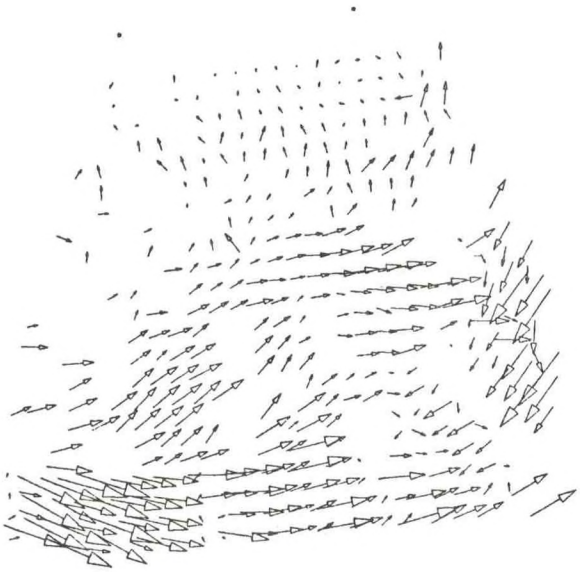
TRUE NORTH



0540 16-OCT-82
0550 16-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0640 16-OCT-82
0650 16-OCT-82

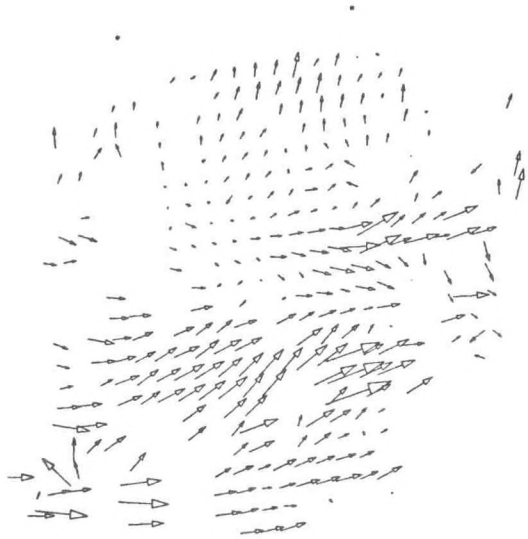
8.0 KM . 200.0 CM/S

TRUE NORTH

0740 16-OCT-82
0750 16-OCT-82

8.0 KM . 200.0 CM/S

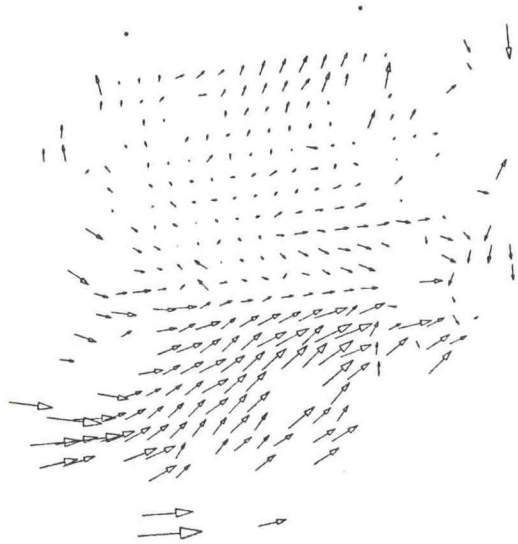
TRUE NORTH



0840 16-OCT-82
0850 16-OCT-82

8.0 KM , 200.0 CM/S

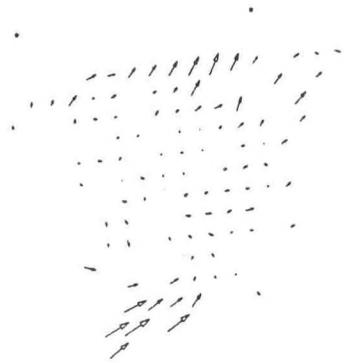
TRUE NORTH



0940 16-OCT-82
0950 16-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1040 16-OCT-82
1050 16-OCT-82

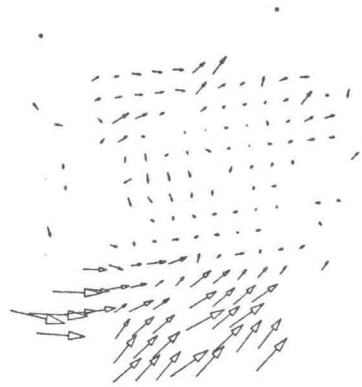
8.0 KM . 200.0 CM/S

TRUE NORTH

1140 16-OCT-82
1150 16-OCT-82

8.0 KM . 200.0 CM/S

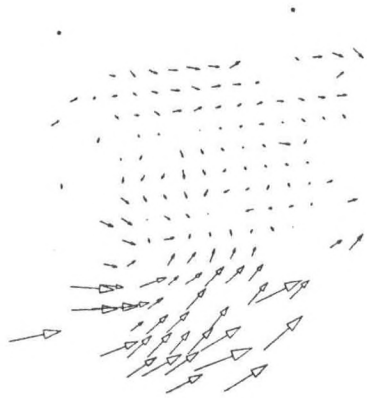
TRUE NORTH



1240 16-OCT-82
1250 16-OCT-82

8.0 KM . 200.0 CM/S

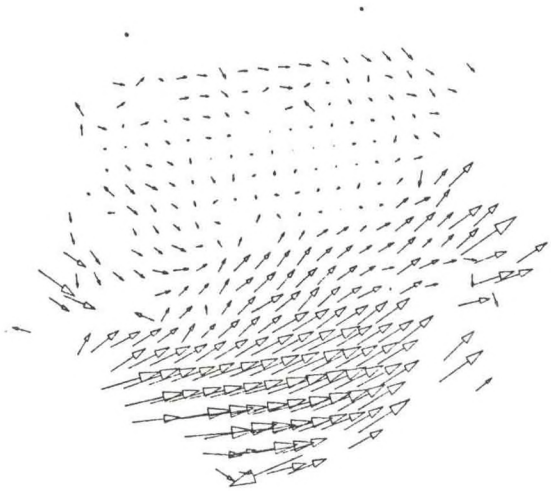
TRUE NORTH



1340 16-OCT-82
1350 16-OCT-82

8.0 KM . 200.0 CM/S

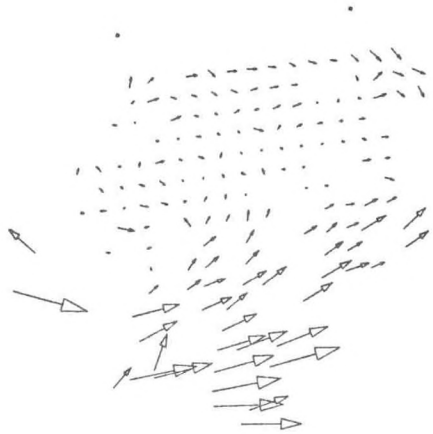
TRUE NORTH



1440 16-OCT-82
1450 16-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1540 16-OCT-82
1550 16-OCT-82

8.0 KM , 200.0 CM/S

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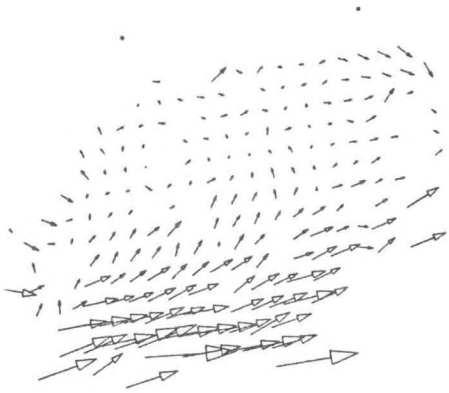

1640 16-OCT-82
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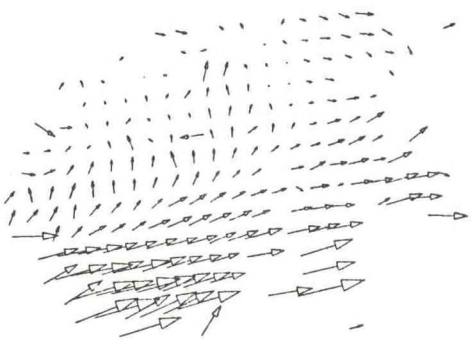

1740 16-OCT-82
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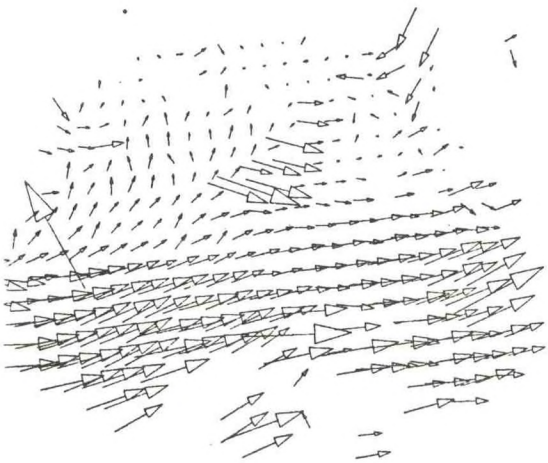

1840 16-OCT-82
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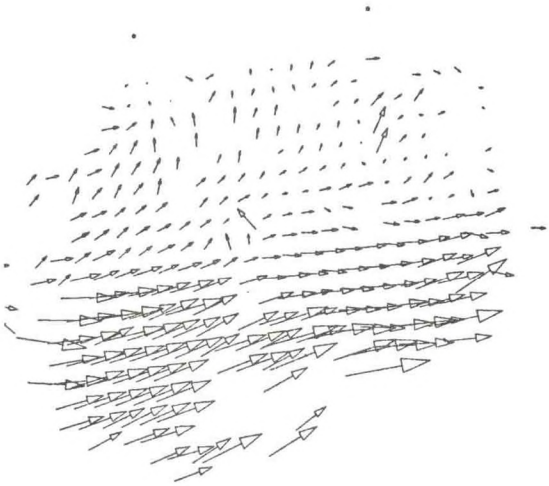

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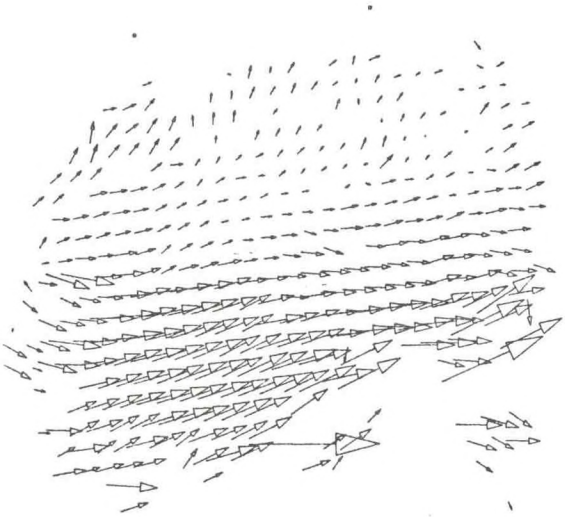

2040 16-OCT-82
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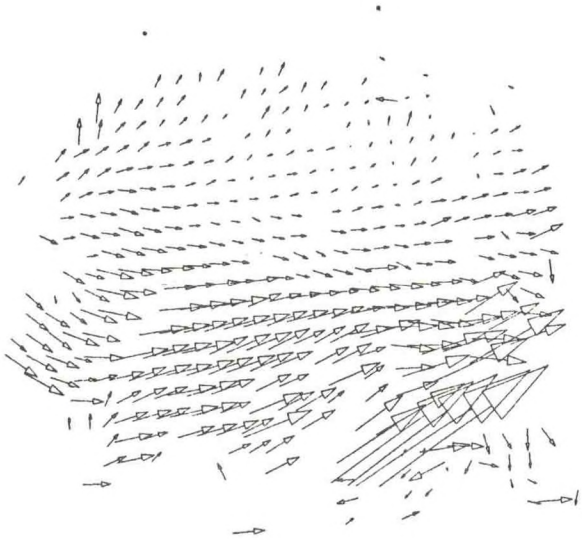

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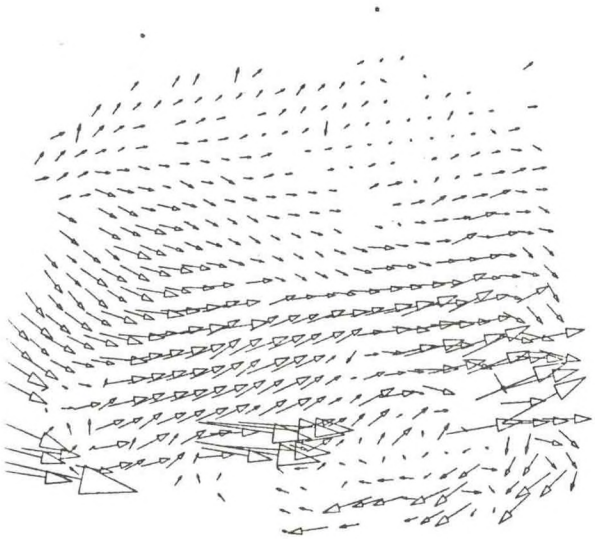

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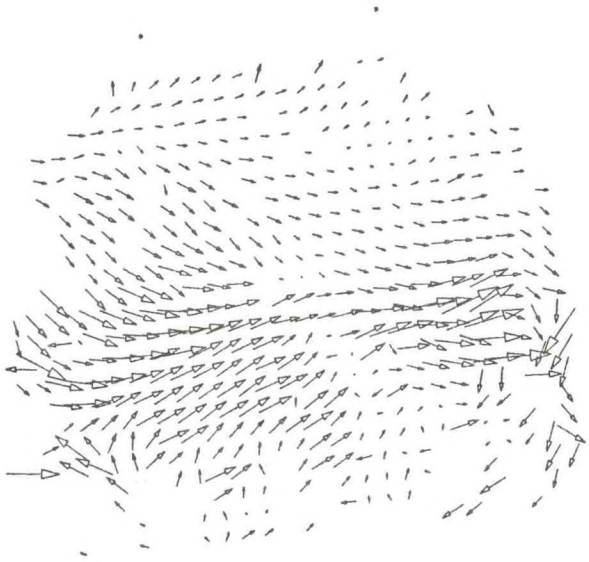

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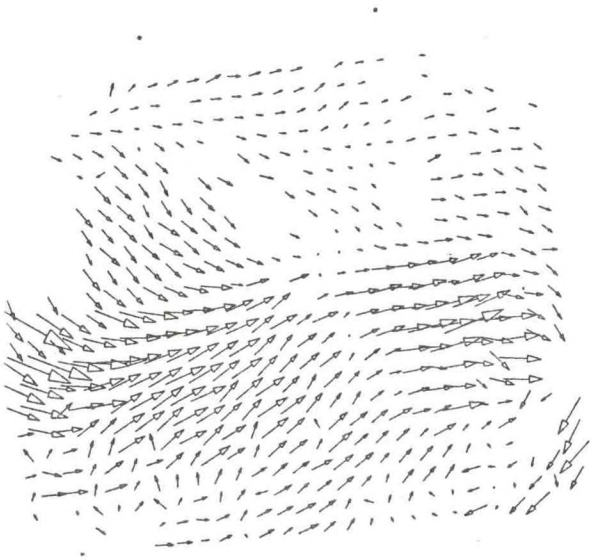

0040 17-OCT-82
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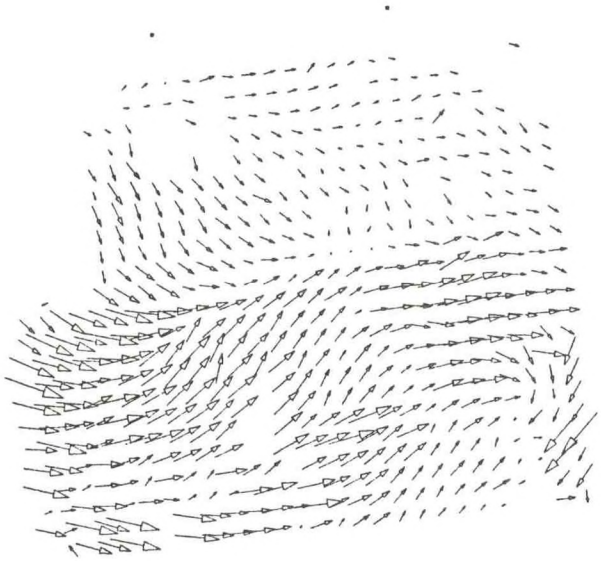

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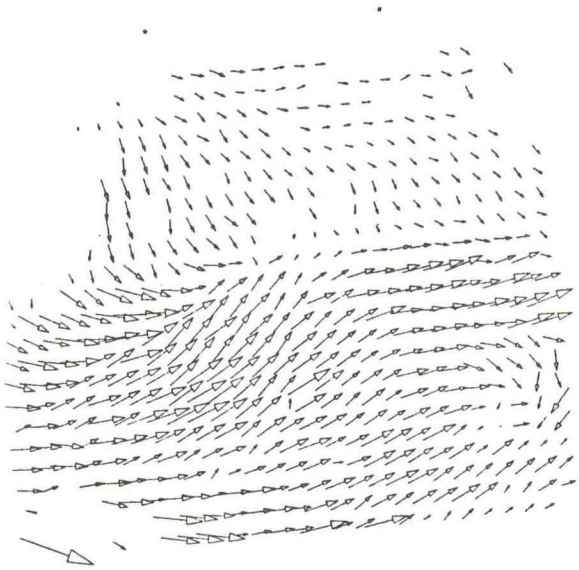

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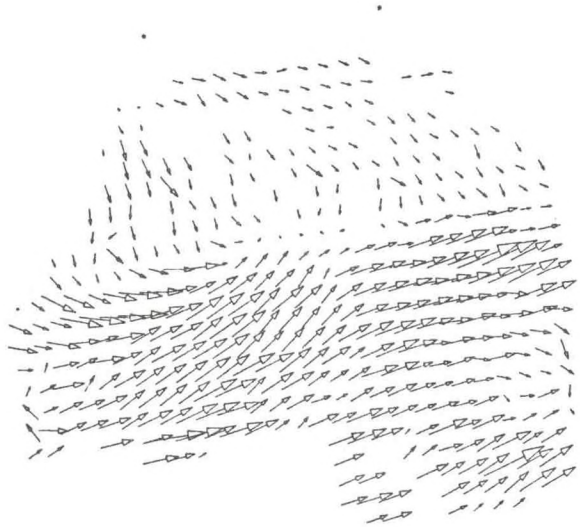

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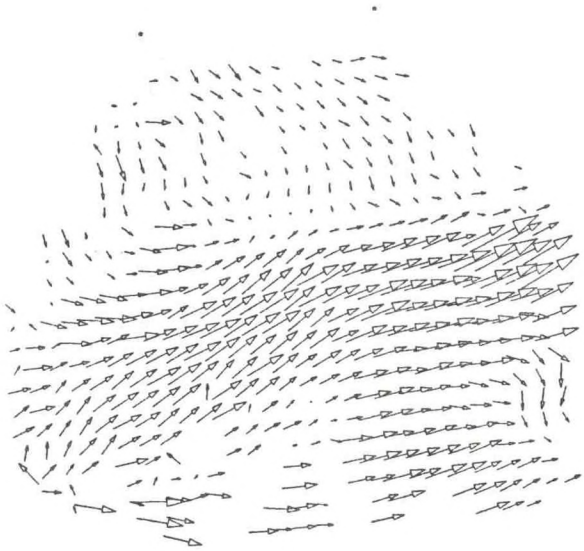

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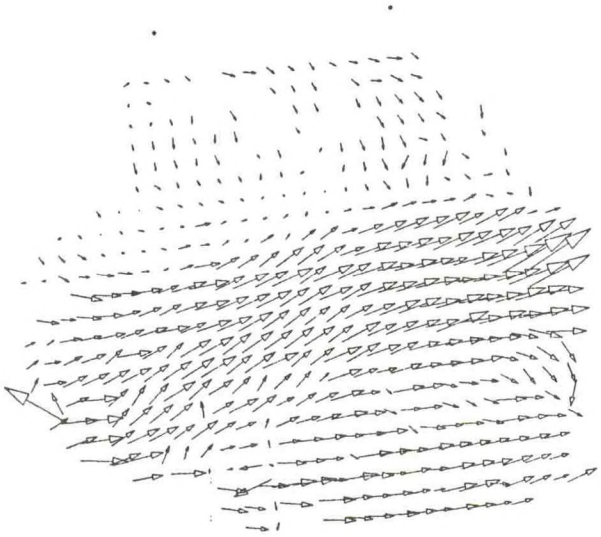

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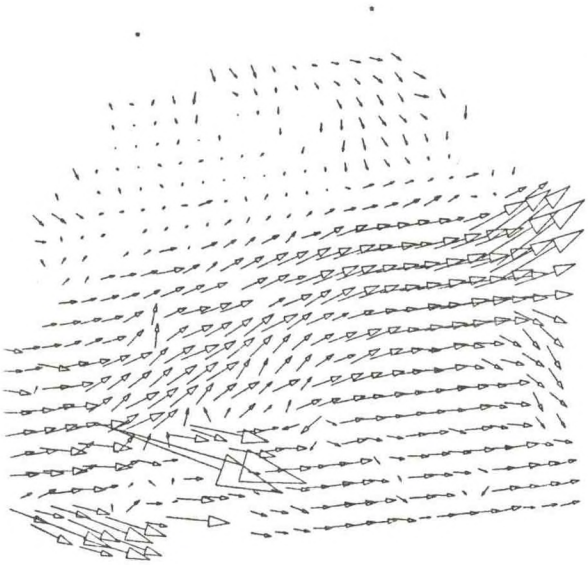

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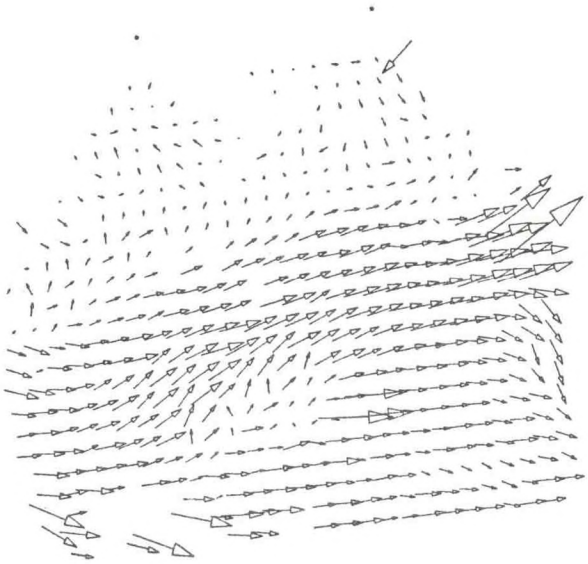

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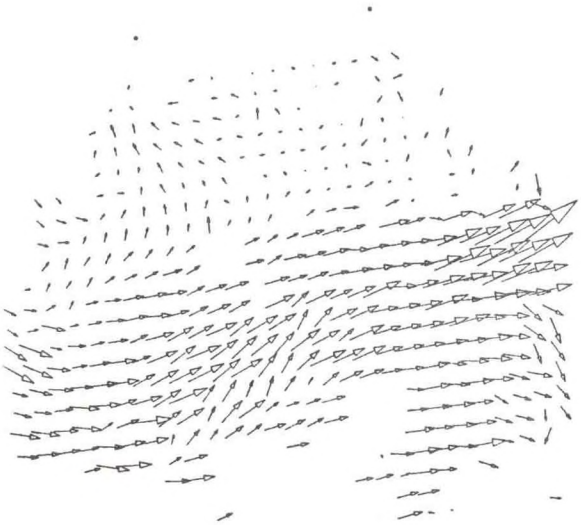

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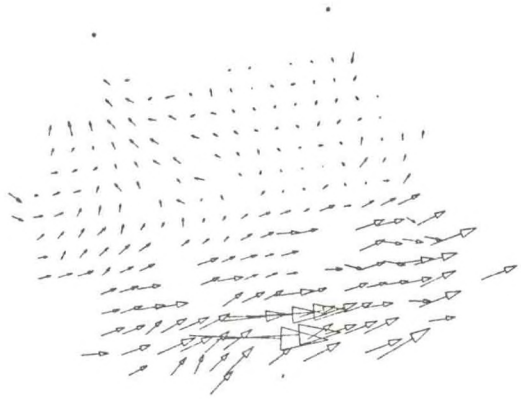

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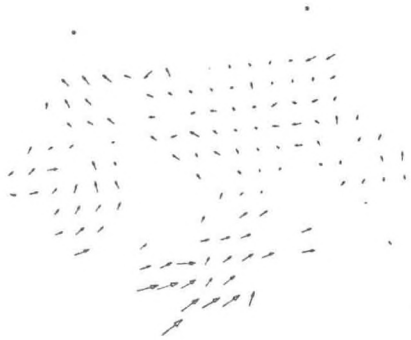

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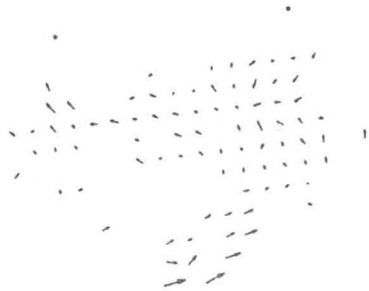

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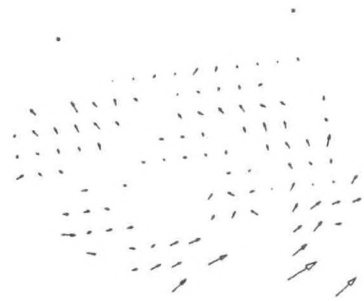

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8.0 KM . 200.0 CM/S

TRUE NORTH

1340 17-OCT-82
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8.0 KM . 200.0 CM/S

TRUE NORTH

1440 17-OCT-82
1450 17-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

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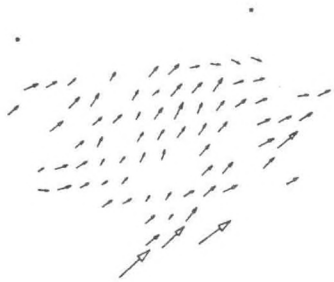

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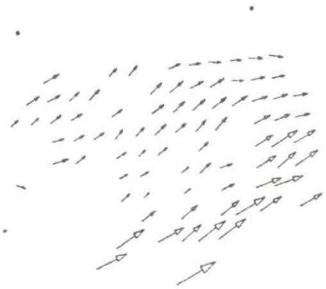

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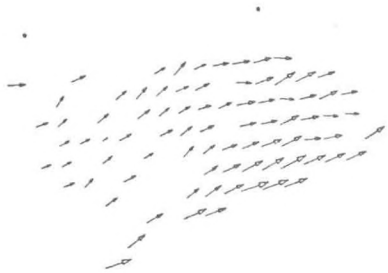

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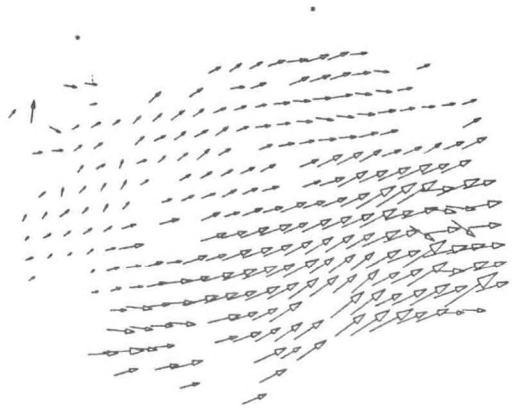

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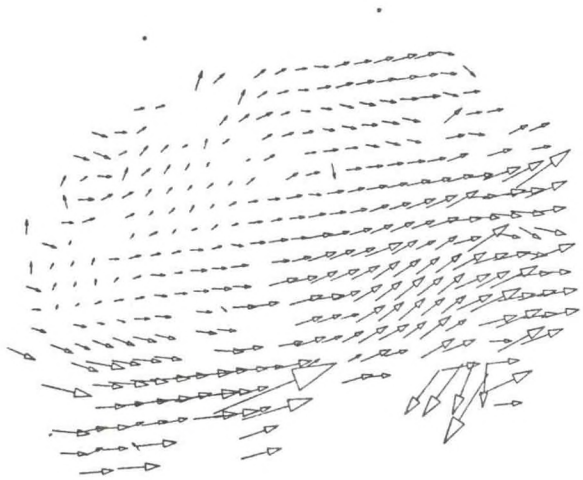

2040 17-OCT-82
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TRUE NORTH

2140 17-OCT-82
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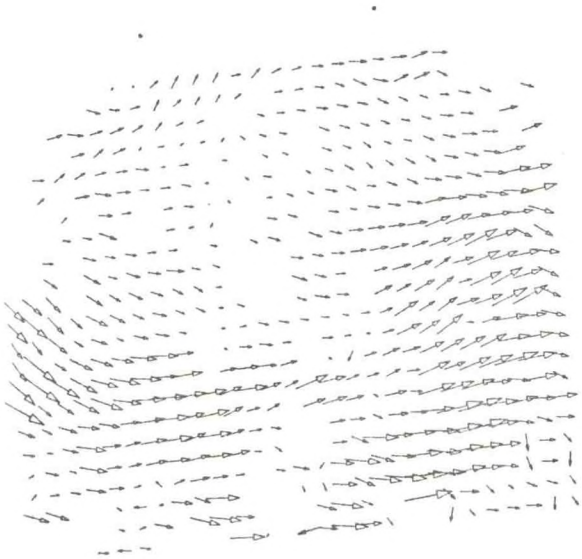

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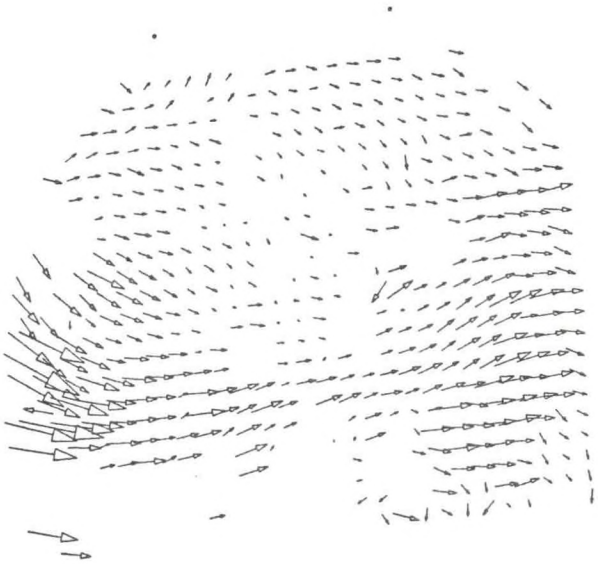

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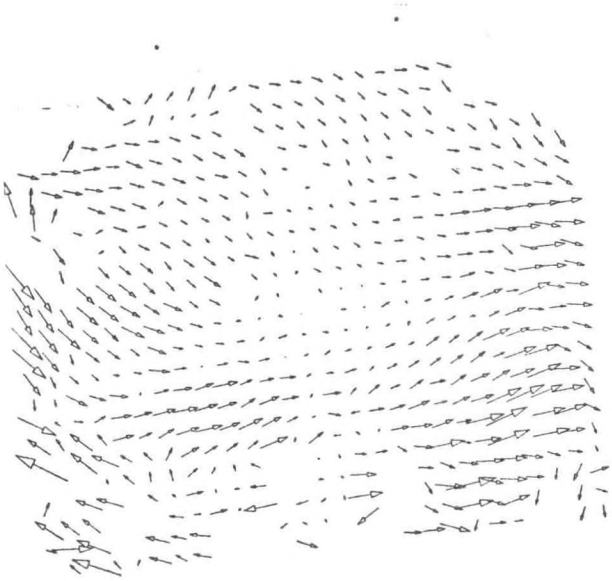

0040 18-OCT-82
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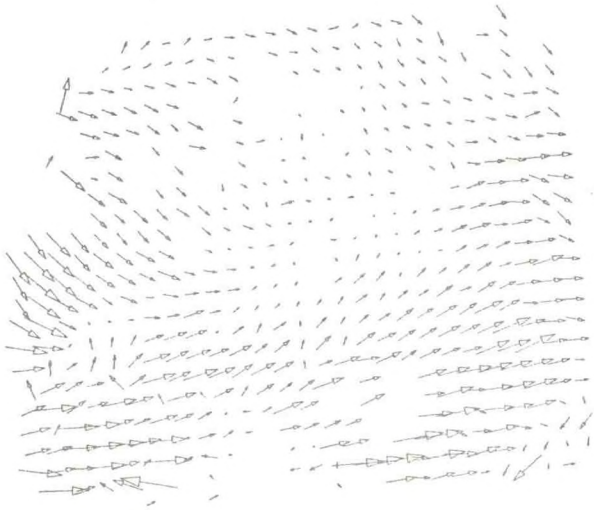

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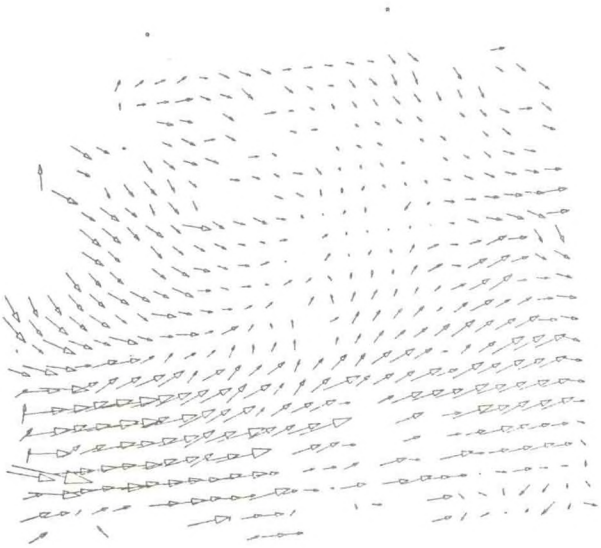

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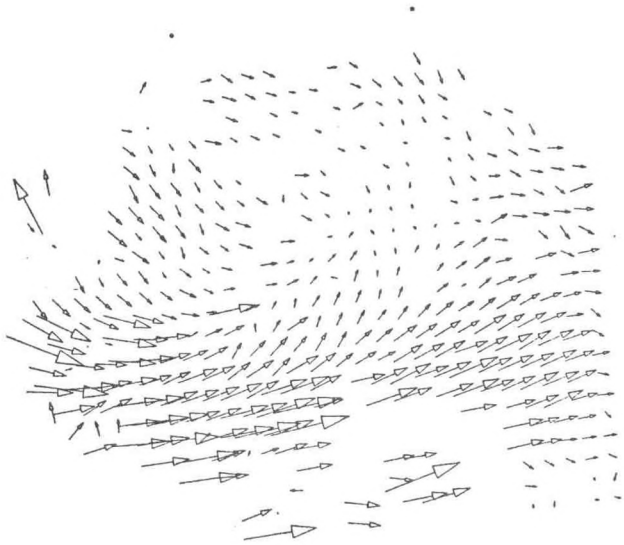

0340 18-OCT-82
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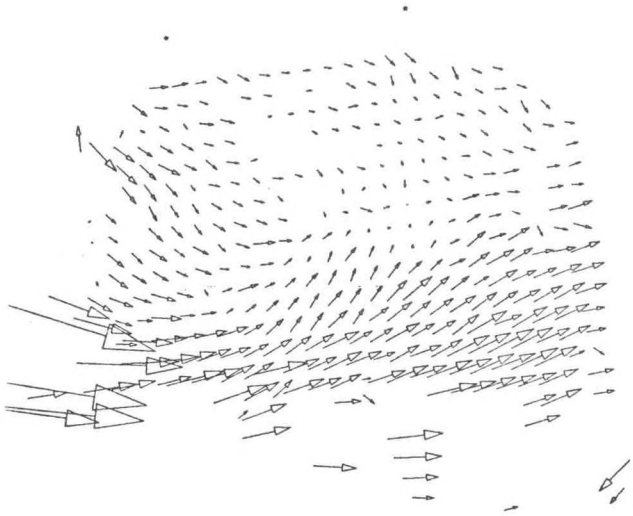

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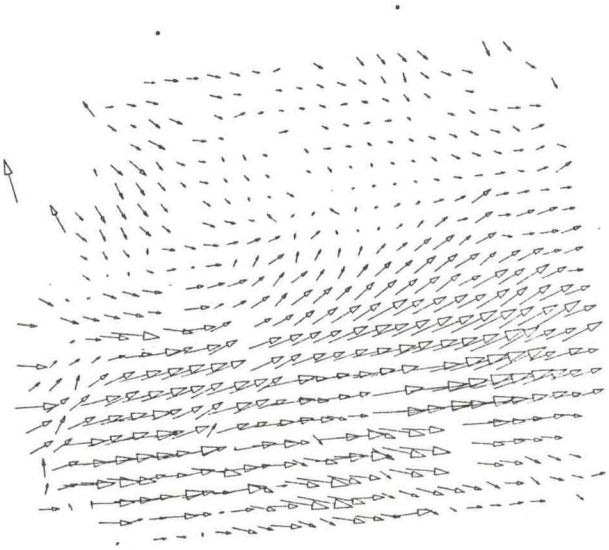

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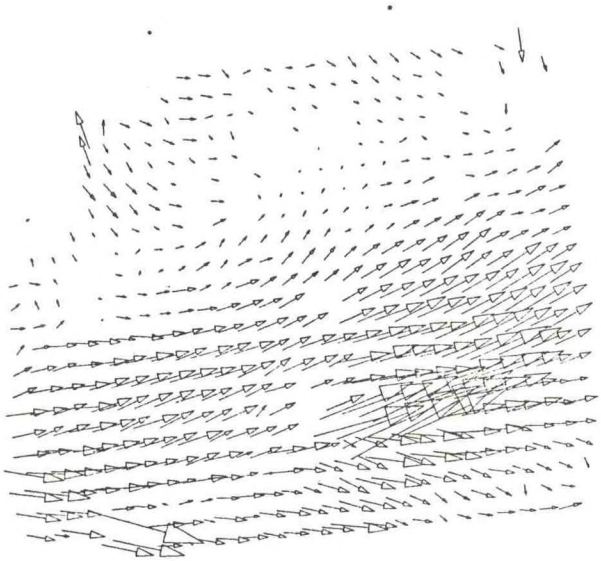

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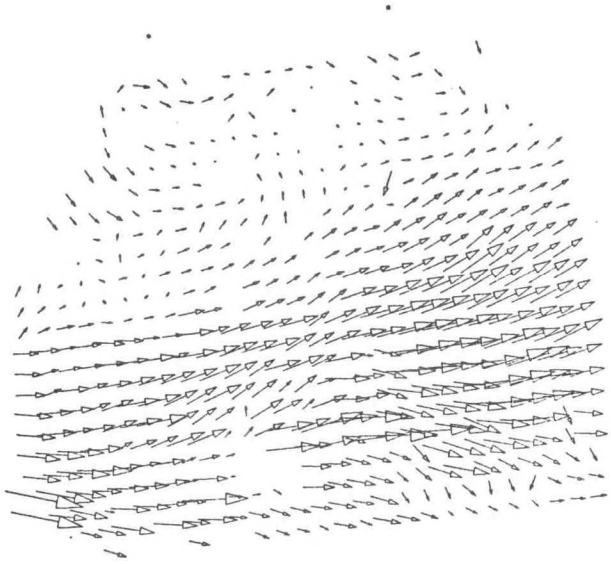

0740 18-OCT-82
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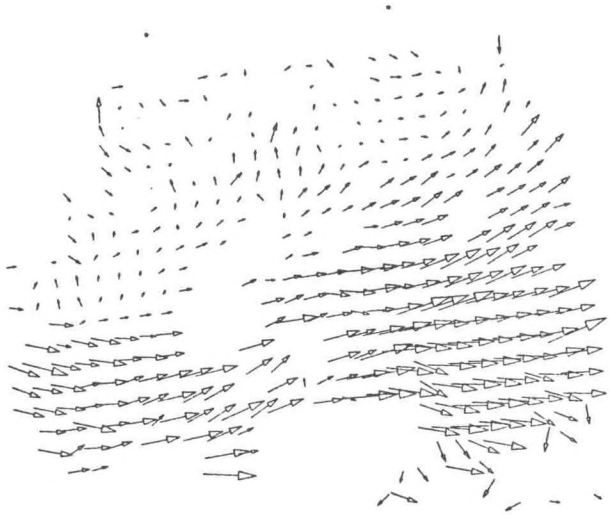
TRUE NORTH



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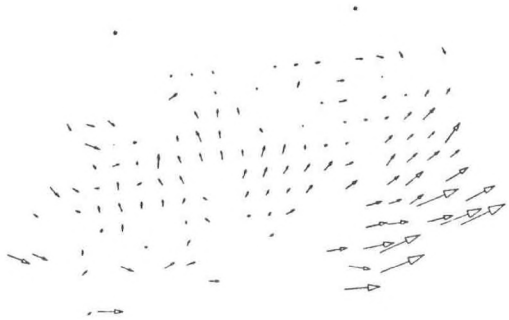

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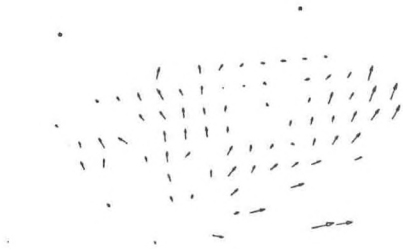

1040 18-OCT-82
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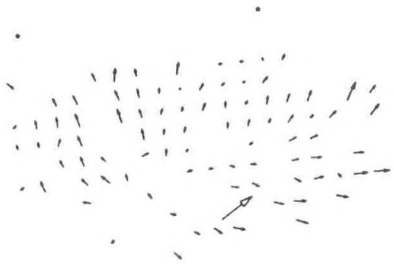
TRUE NORTH



1140 18-OCT-82
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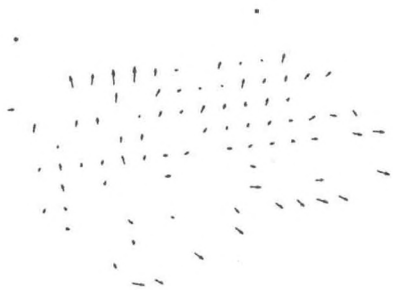

1240 18-OCT-82
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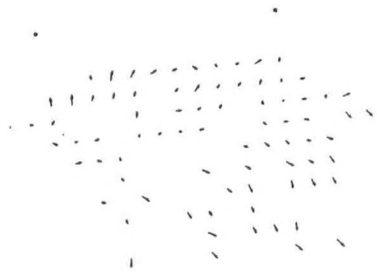

1340 18-OCT-82
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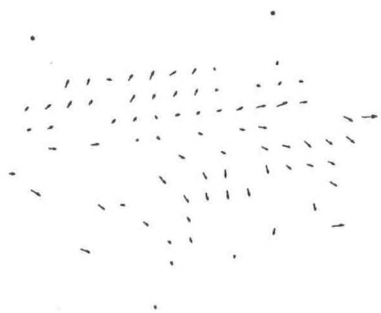

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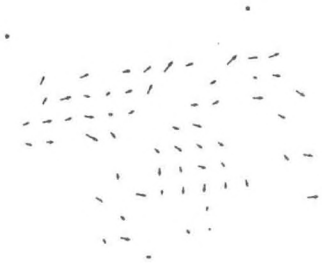
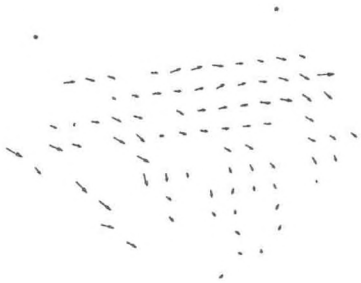


1540 18-OCT-82
1550 18-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1640 18-OCT-82
1650 18-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1740 18-OCT-82
1750 18-OCT-82

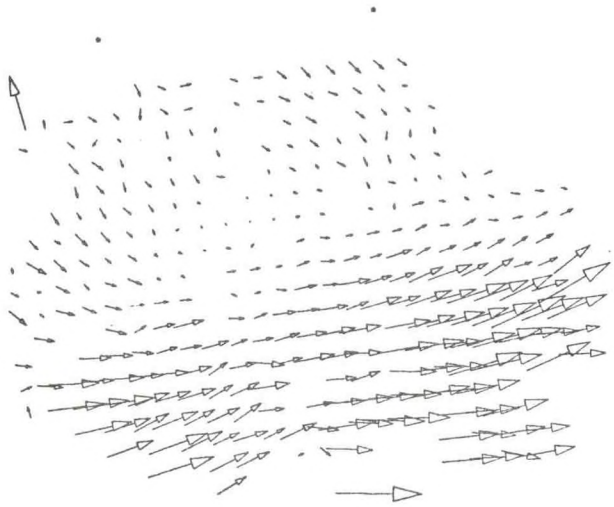
8.0 KM , 200.0 CM/S

TRUE NORTH

1840 18-OCT-82
1850 18-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1940 18-OCT-82
1950 18-OCT-82

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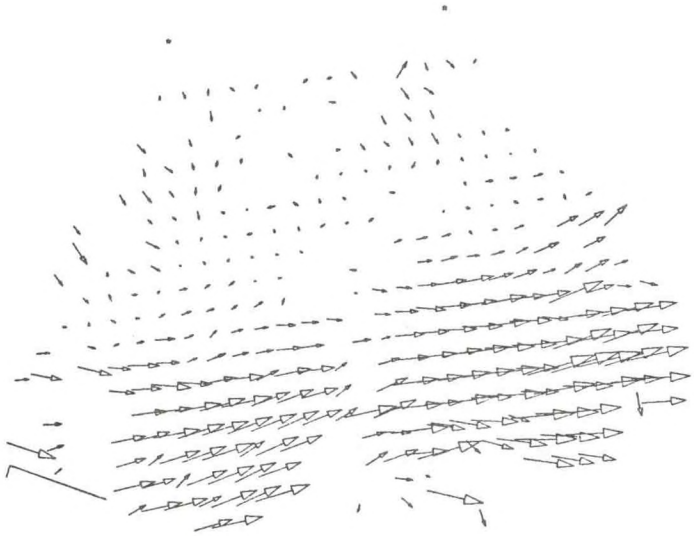
TRUE NORTH



2040 18-OCT-82
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8.0 KM , 200.0 CM/S

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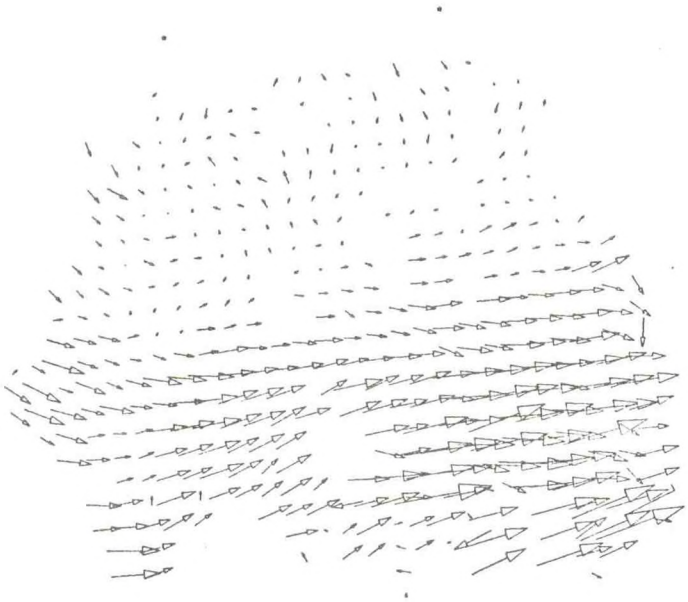

2140 18-OCT-82
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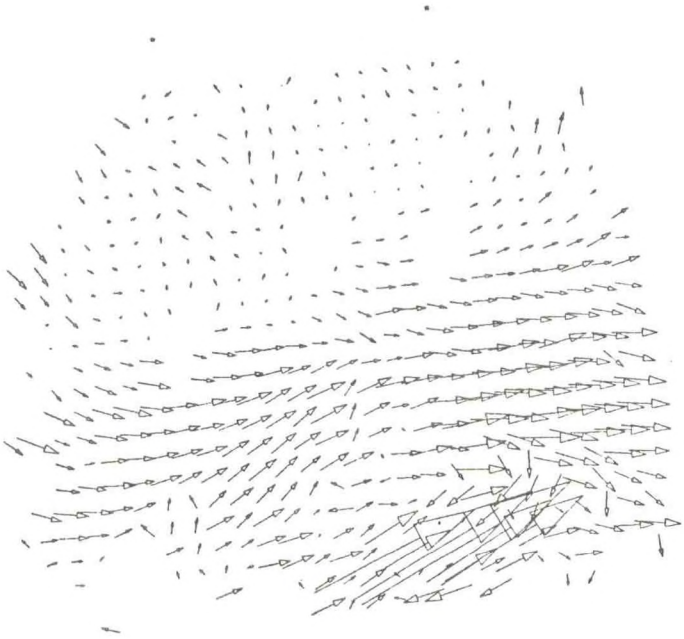

2240 18-OCT-82
2250 18-OCT-82

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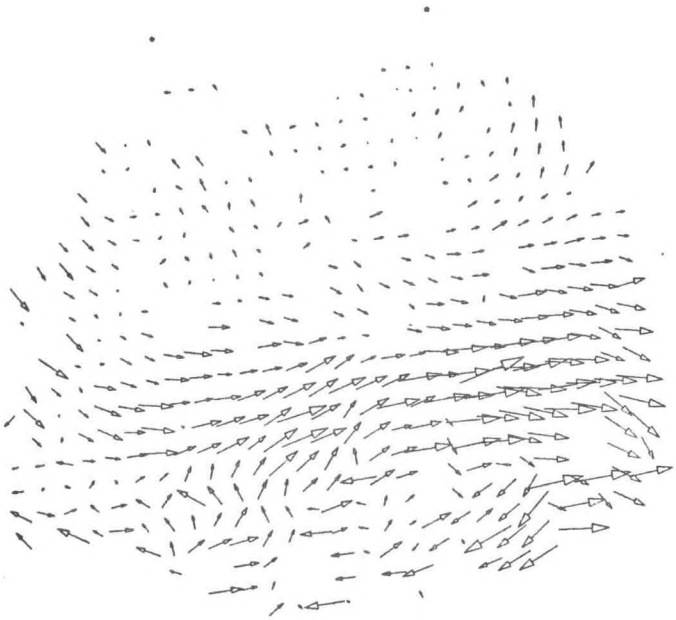

2340 18-OCT-82
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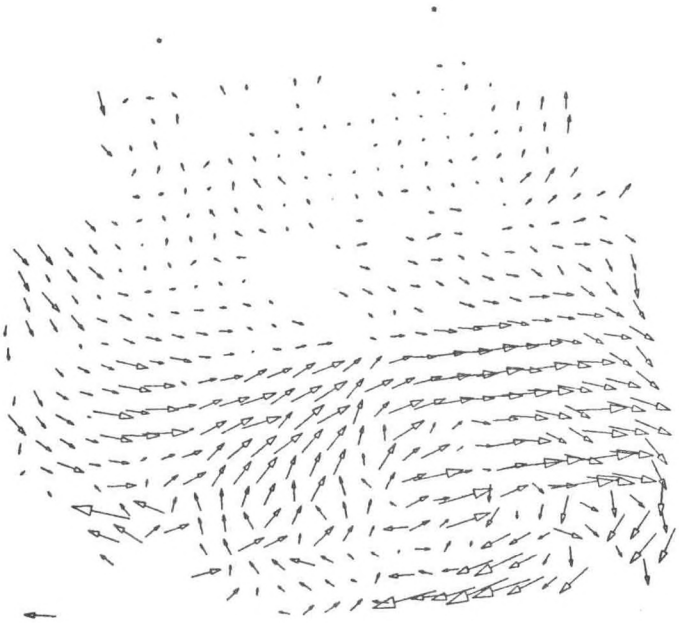

0040 19-OCT-82
0050 19-OCT-82

8.0 KM , 200.0 CM/S

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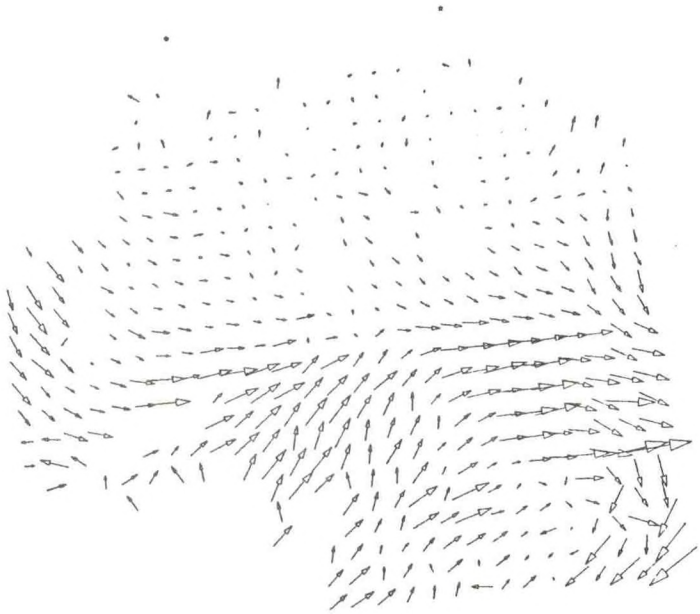

0140 19-OCT-82
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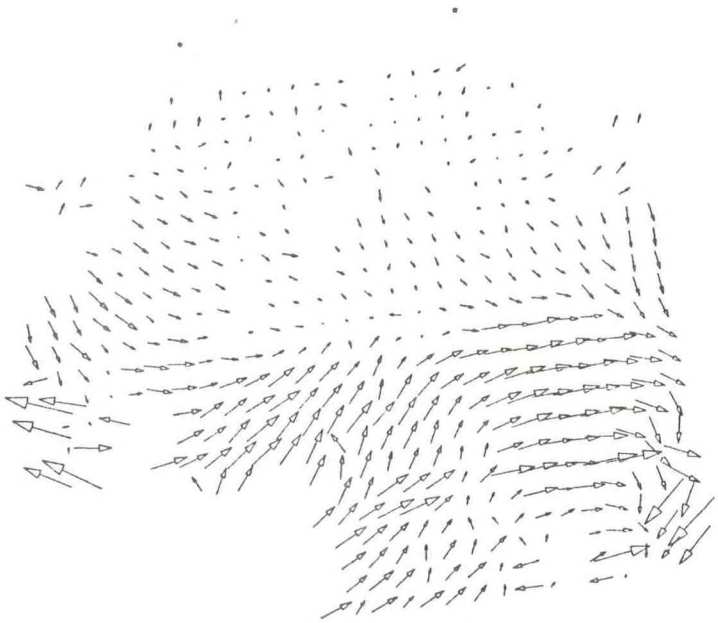

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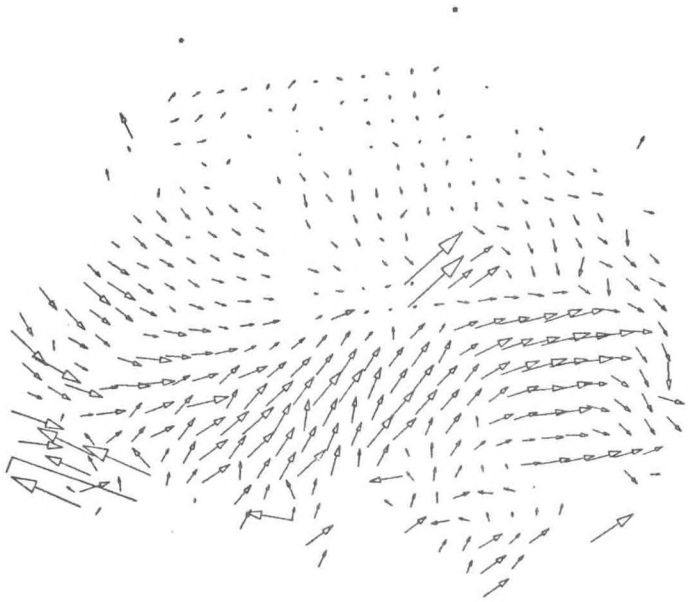

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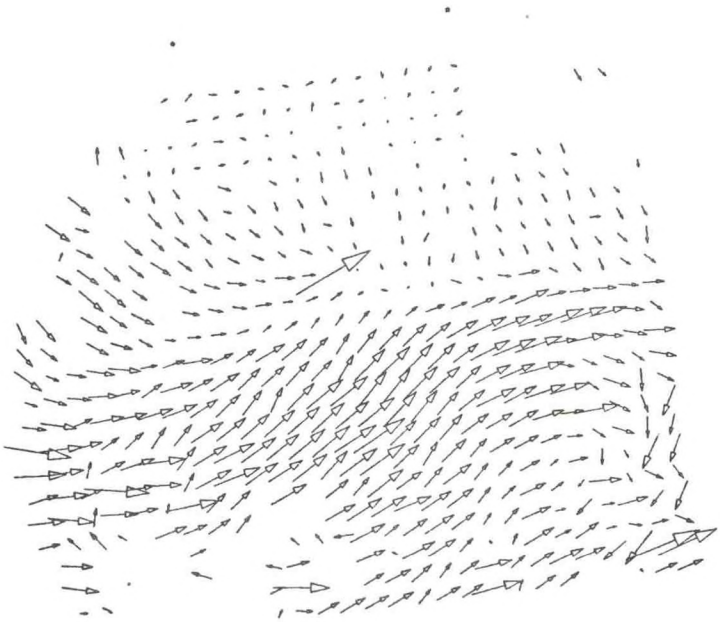

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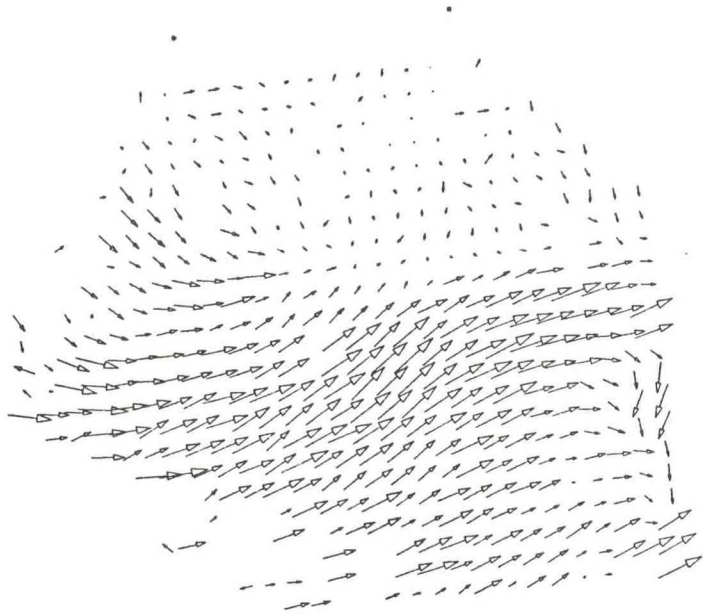

0540 19-OCT-82
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8.0 KM , 200.0 CM/S

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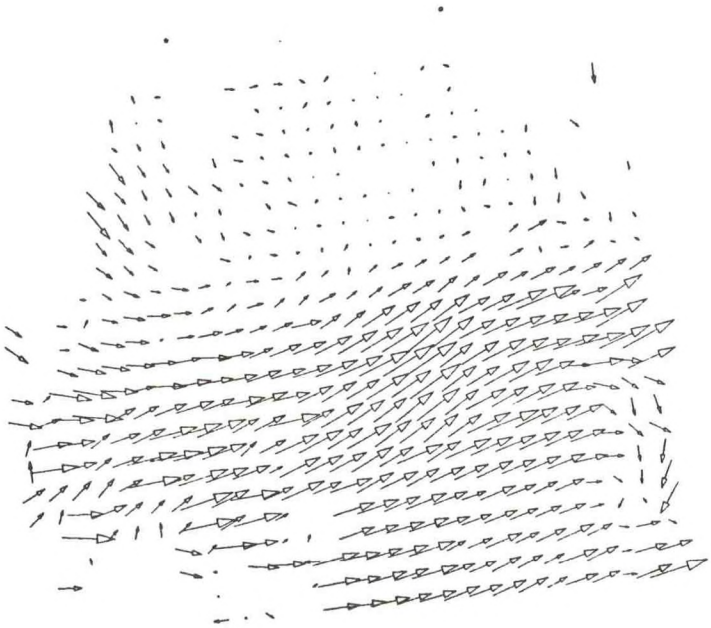

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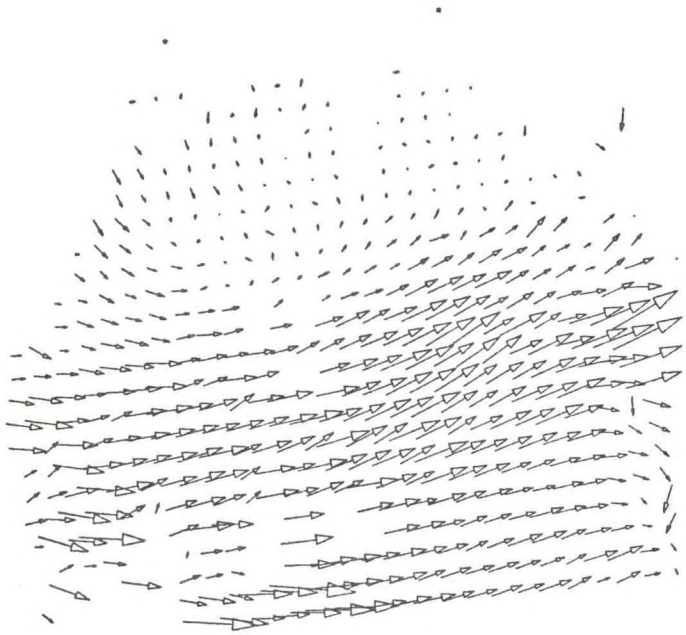

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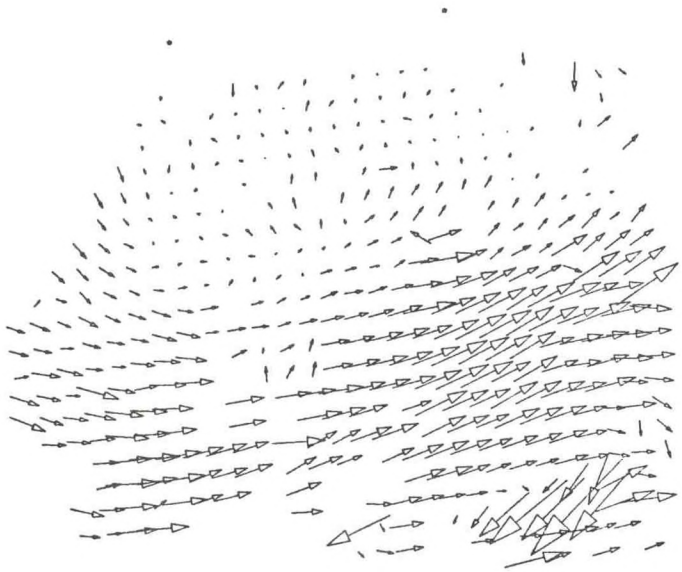

0840 19-OCT-82
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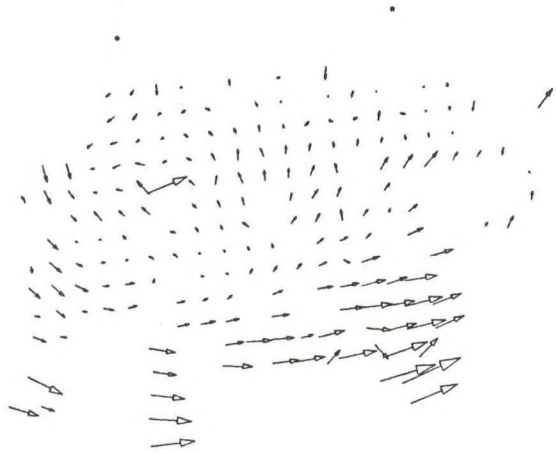

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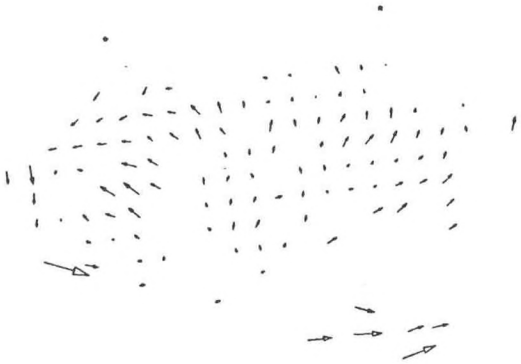

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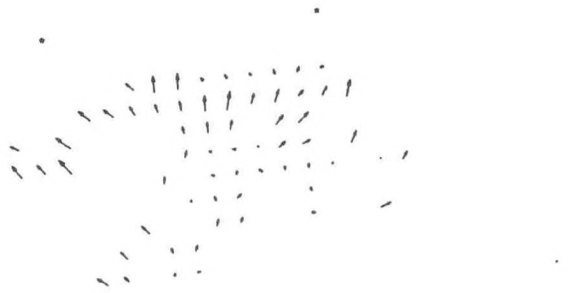

1140 19-OCT-82
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8.0 KM , 200.0 CM/S

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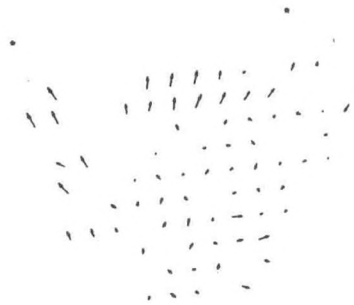

1240 19-OCT-82
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8.0 KM , 200.0 CM/S

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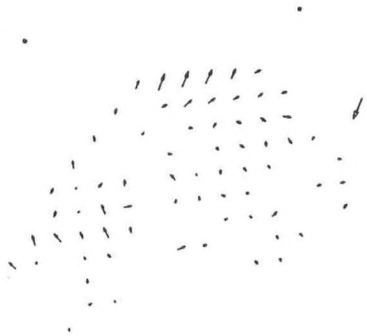

1340 19-OCT-82
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8.0 KM , 200.0 CM/S

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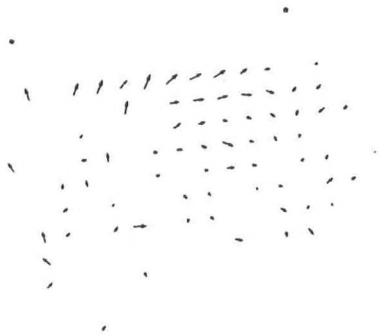

1440 19-OCT-82
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8.0 KM , 200.0 CM/S

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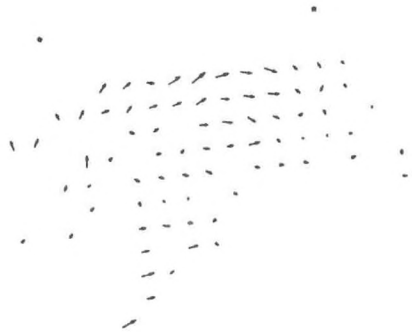

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8.0 KM , 200.0 CM/S

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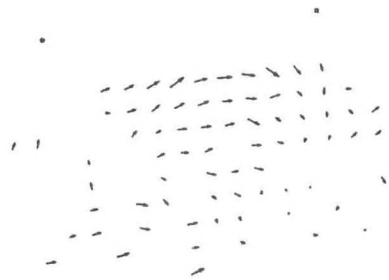

1640 19-OCT-82
1650 19-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1740 19-OCT-82
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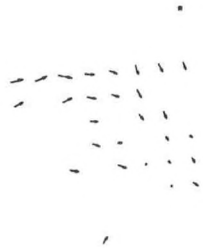
8.0 KM , 200.0 CM/S

TRUE NORTH



1840 19-OCT-82
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8.0 KM , 200.0 CM/S

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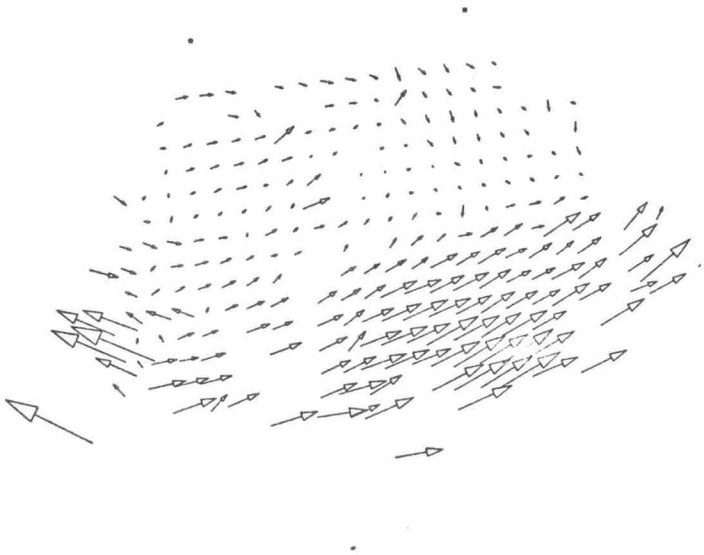

1940 19-OCT-82
1950 19-OCT-82

8.0 KM , 200.0 CM/S

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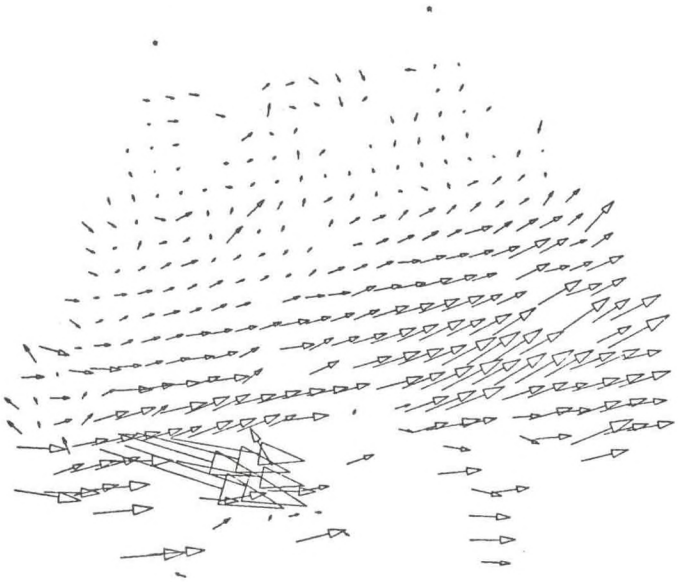

2040 19-OCT-82
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8.0 KM , 200.0 CM/S

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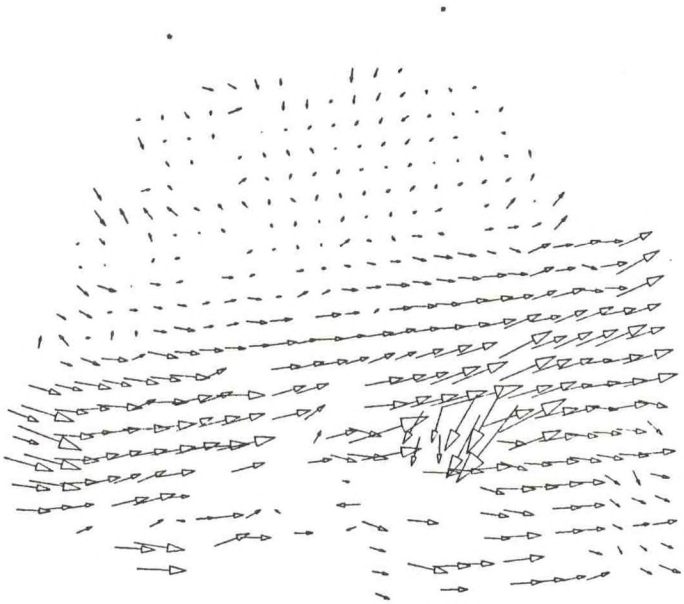

2140 19-OCT-82
2150 19-OCT-82

8.0 KM , 200.0 CM/S

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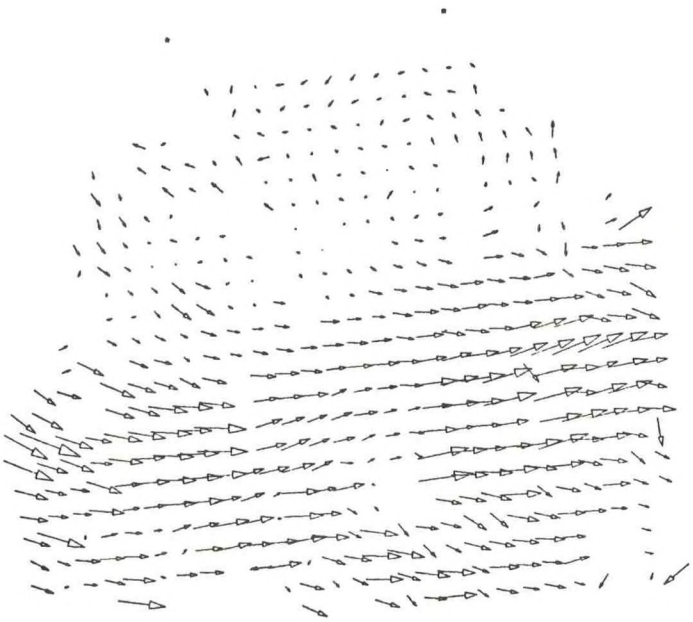

2240 19-OCT-82
2250 19-OCT-82

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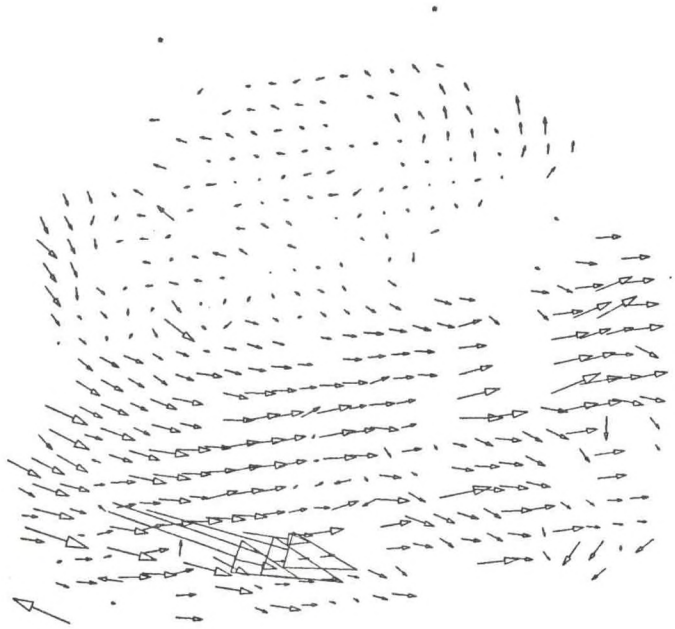

2340 19-OCT-82
2350 19-OCT-82

8.0 KM , 200.0 CM/S

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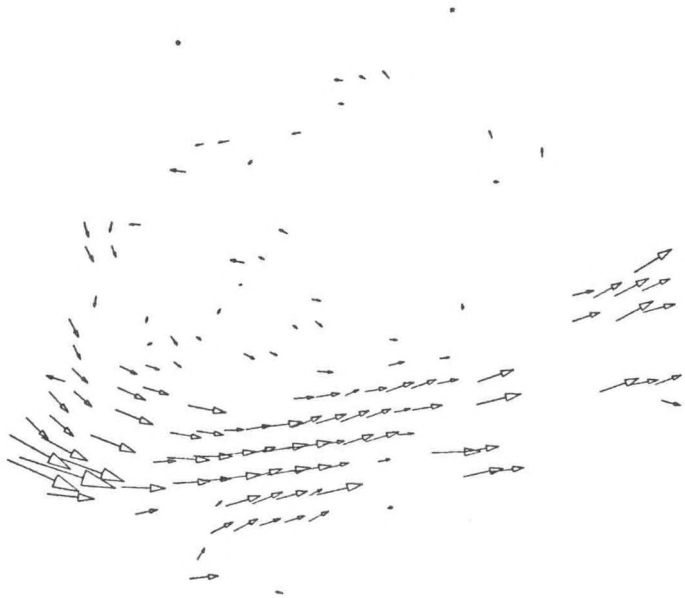

0040 19*OCT*82
0050 20-OCT-82

8.0 KM , 200.0 CM/S

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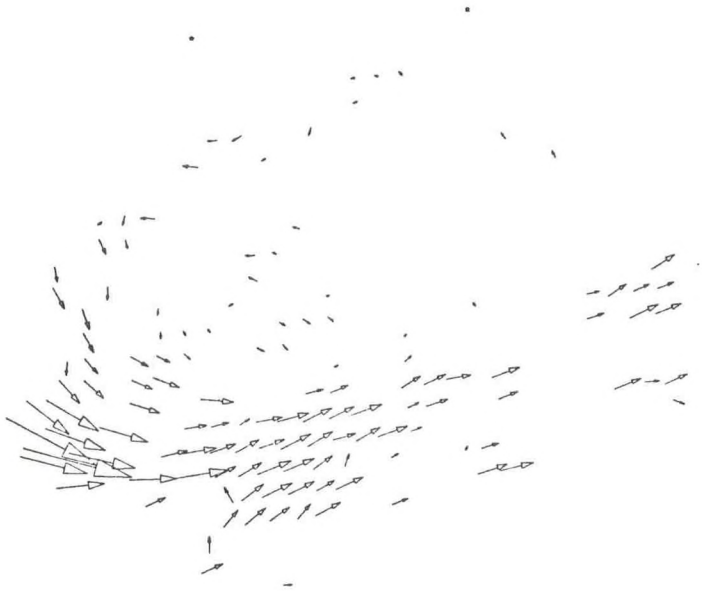
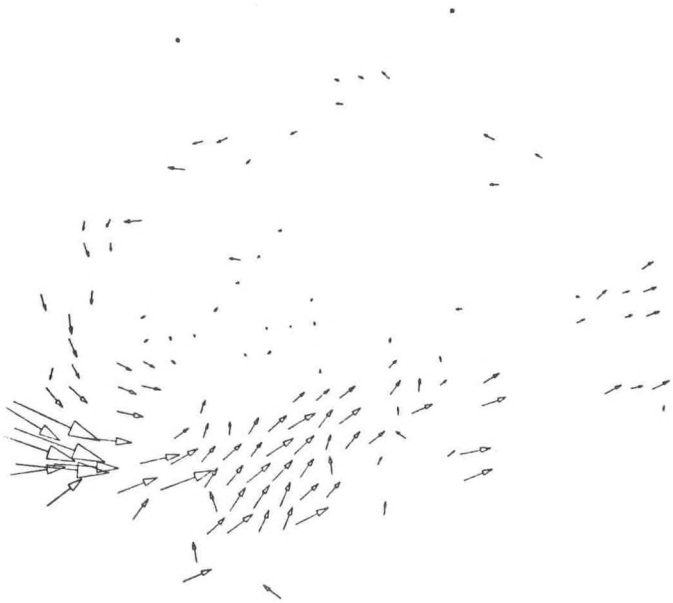


0140 19*OCT*82
0150 20-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0240 20-OCT-82
0250 20-OCT-82

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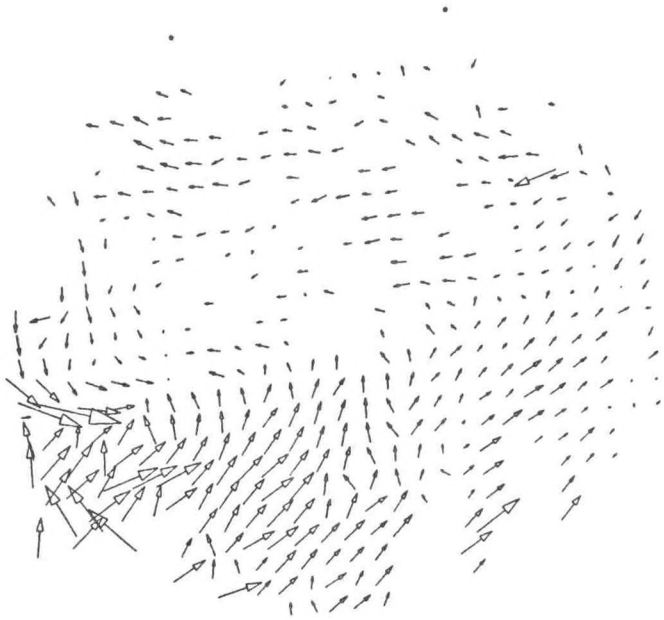

0340 20-OCT-82
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8.0 KM , 200.0 CM/S

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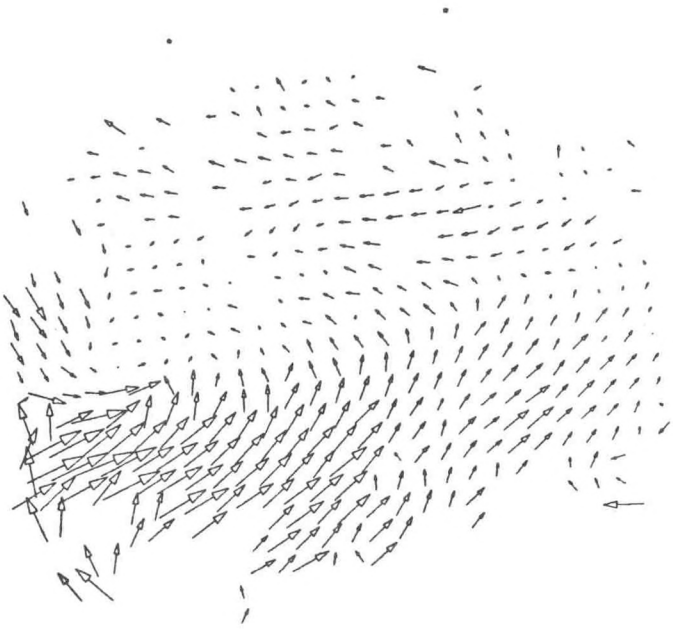
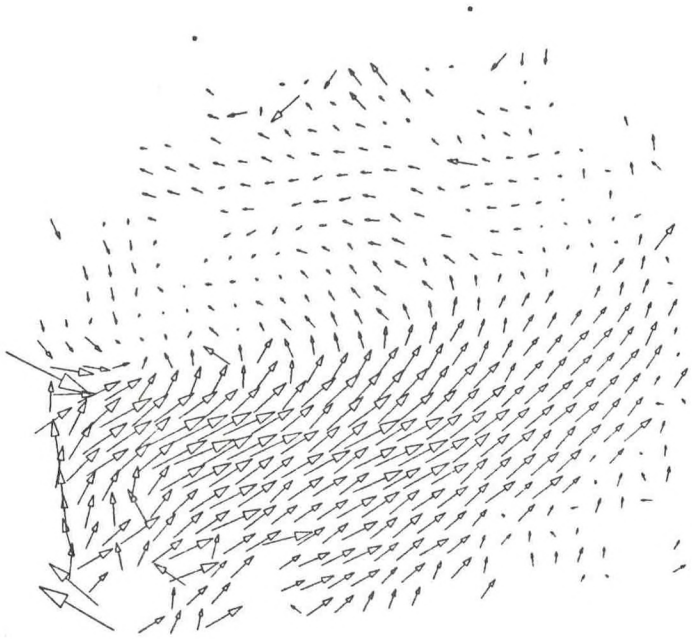


0440 20-OCT-82
0450 20-OCT-82

8.0 KM , 200.0 CM/S

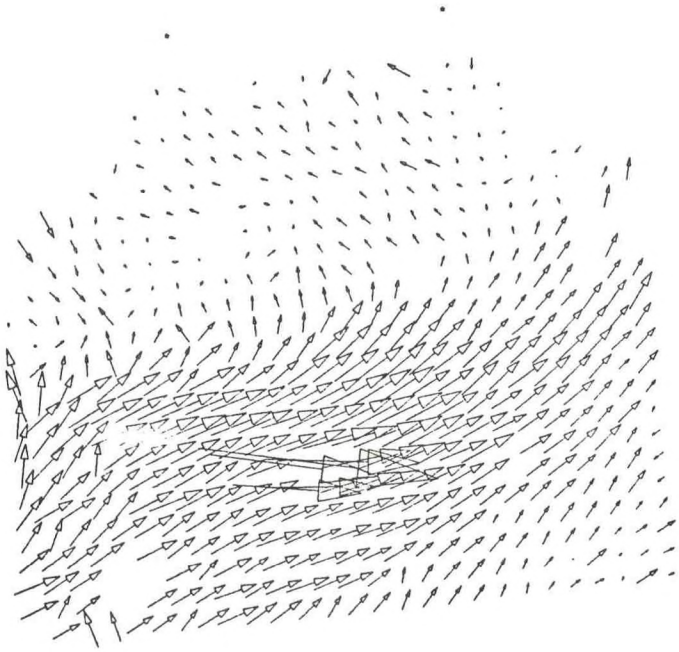
TRUE NORTH ↑



0540 20-OCT-82
0550 20-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑



0640 20-OCT-82
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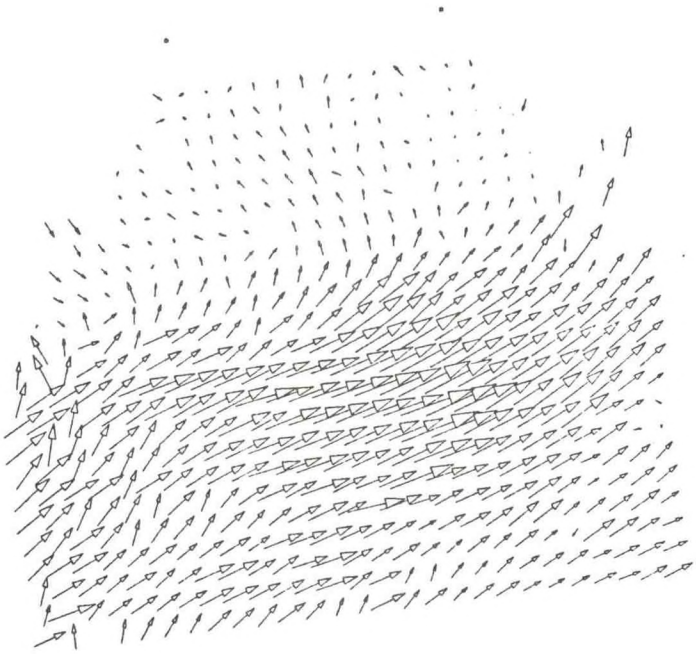
TRUE NORTH



0740 20-OCT-82
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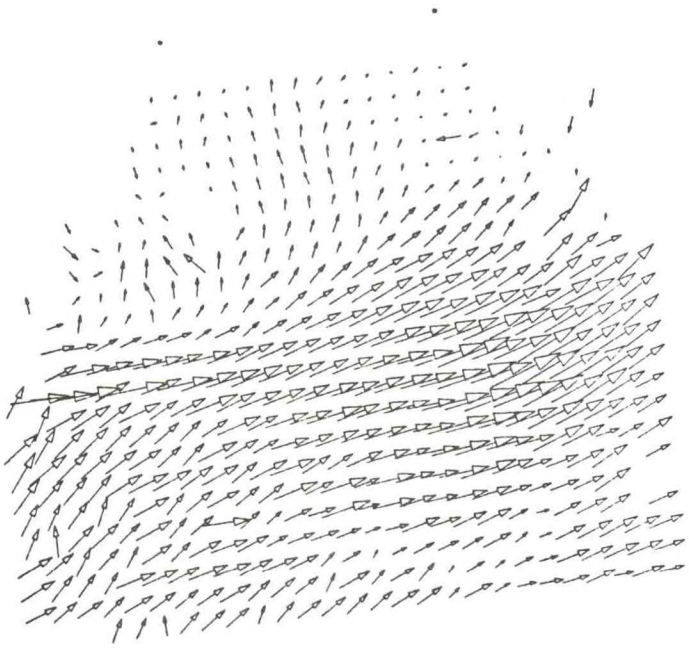
TRUE NORTH



0840 20-OCT-82
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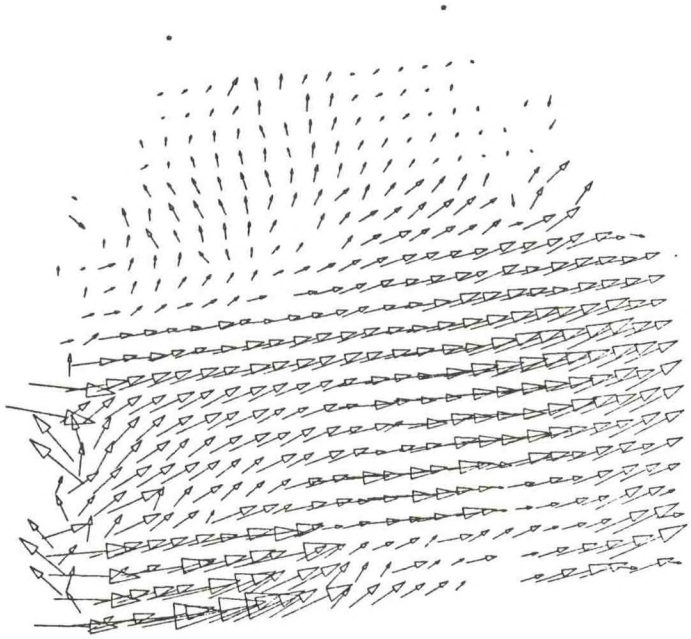
8.0 KM , 200.0 CM/S

TRUE NORTH



0940 20-OCT-82
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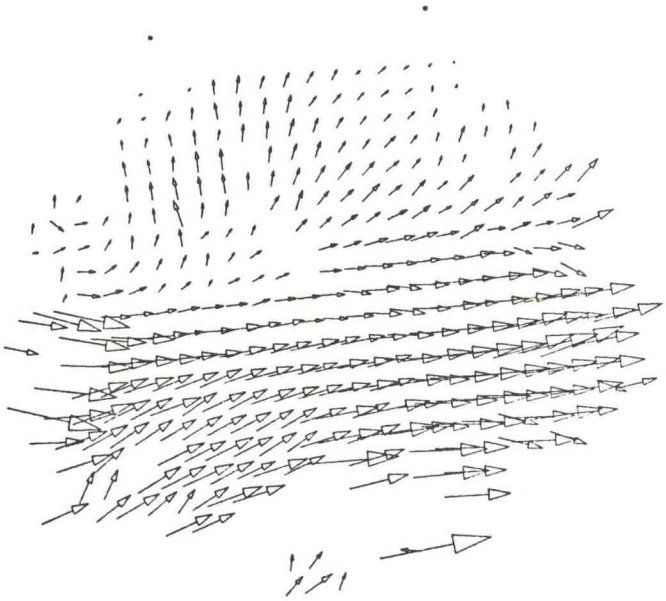
TRUE NORTH



1040 20-OCT-82
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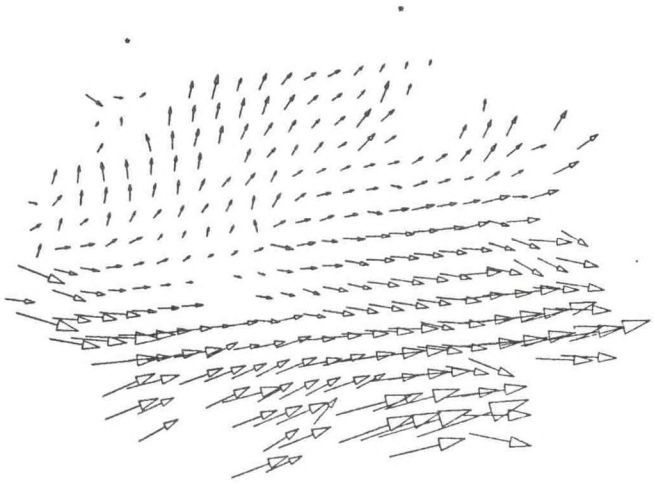
8.0 KM , 200.0 CM/S

TRUE NORTH



1140 20-OCT-82
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8.0 KM , 200.0 CM/S

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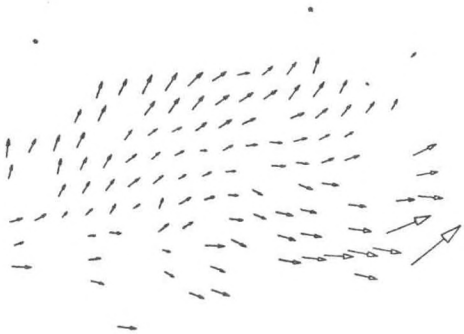

1240 20-OCT-82
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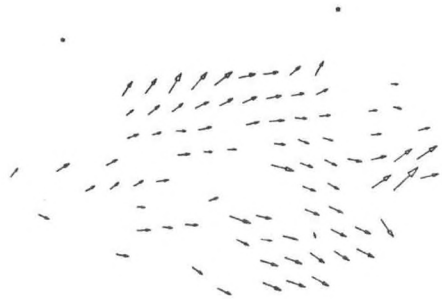
TRUE NORTH



1340 20-OCT-82
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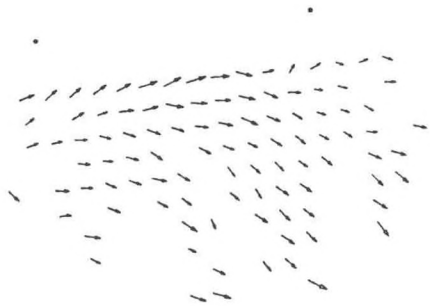
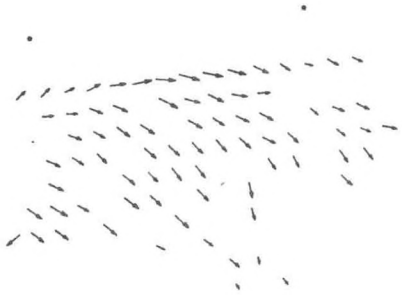
TRUE NORTH



1440 20-OCT-82
1450 20-OCT-82

8.0 KM , 200.0 CM/S

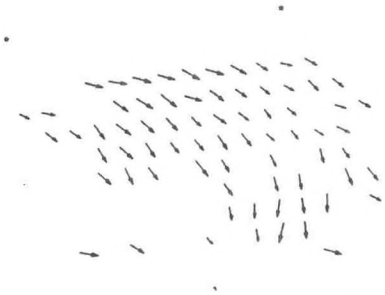
TRUE NORTH



1540 20-OCT-82
1550 20-OCT-82

8.0 KM , 200.0 CM/S

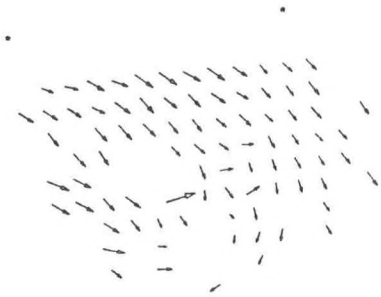
TRUE NORTH



1640 20-OCT-82
1650 20-OCT-82

8.0 KM , 200.0 CM/S

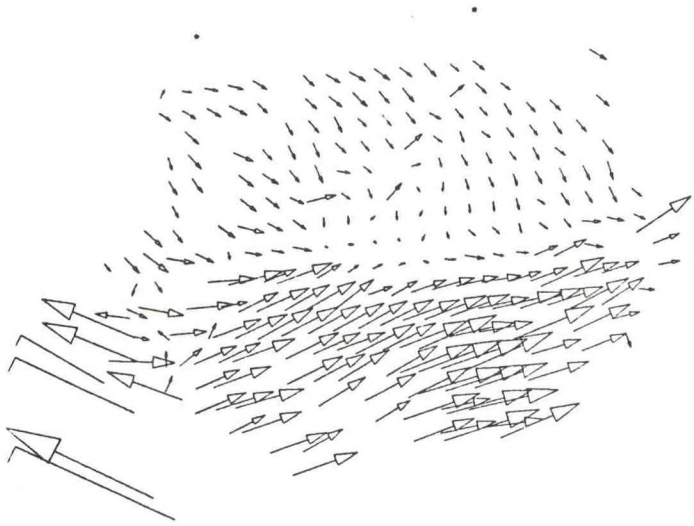
TRUE NORTH



1740 20-OCT-82
1750 20-OCT-82

8.0 KM , 200.0 CM/S

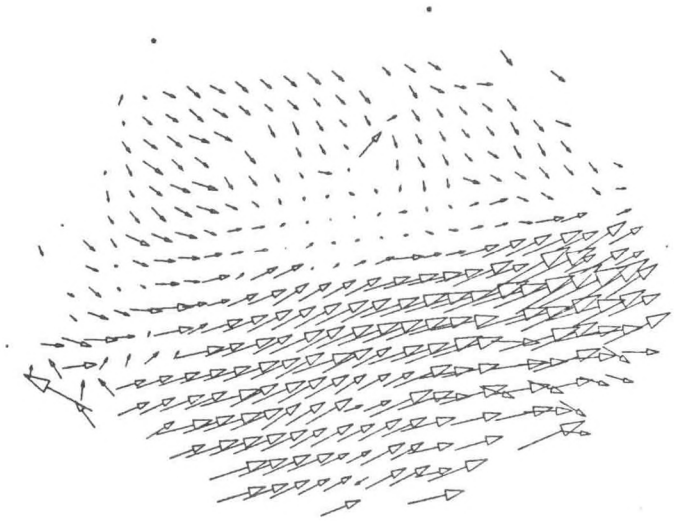
TRUE NORTH



1840 20-OCT-82
1850 20-OCT-82

8.0 KM , 200.0 CM/S

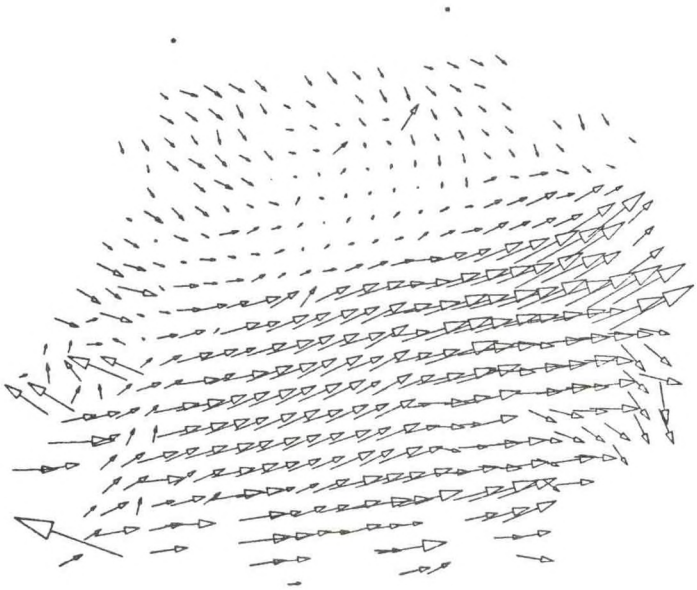
TRUE NORTH



1940 20-OCT-82
1950 20-OCT-82

8.0 KM , 200.0 CM/S

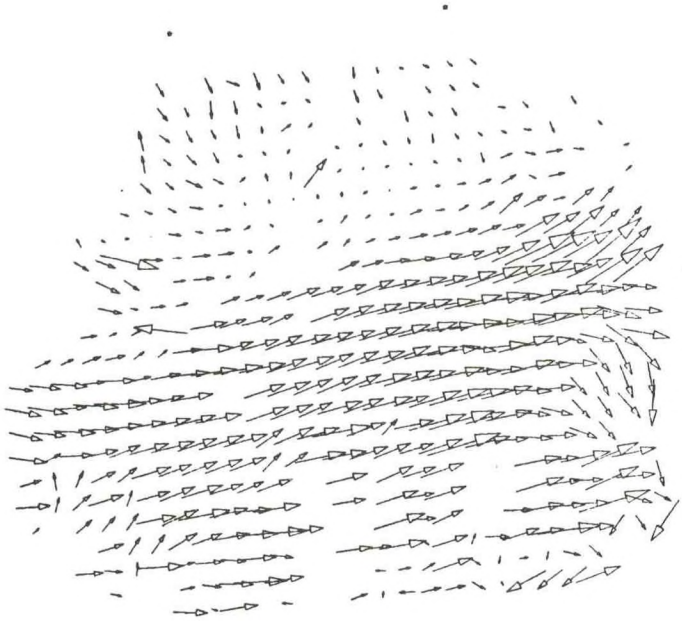
TRUE NORTH



2040 20-OCT-82
2050 20-OCT-82

8.0 KM , 200.0 CM/S

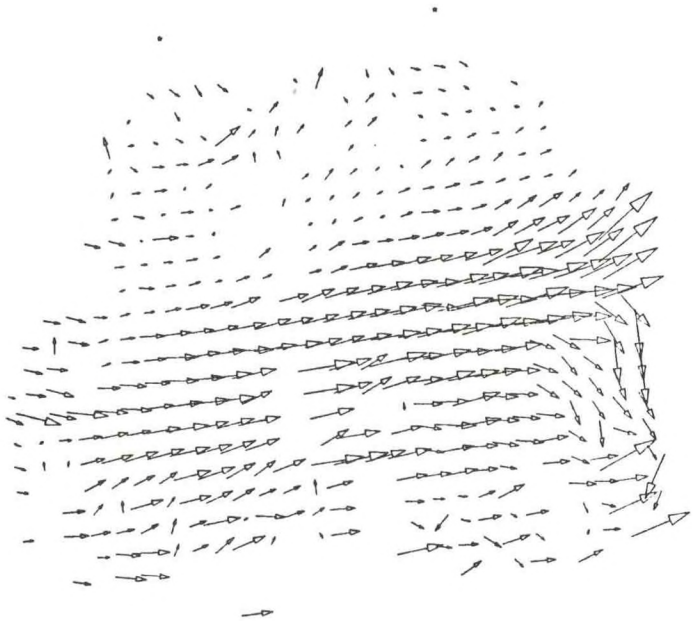
TRUE NORTH



2140 20-OCT-82
2150 20-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



2240 20-OCT-82
2250 20-OCT-82

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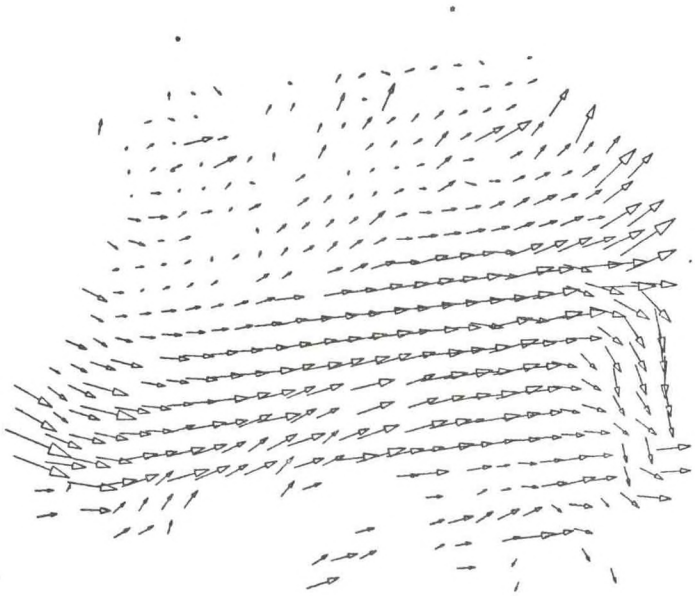
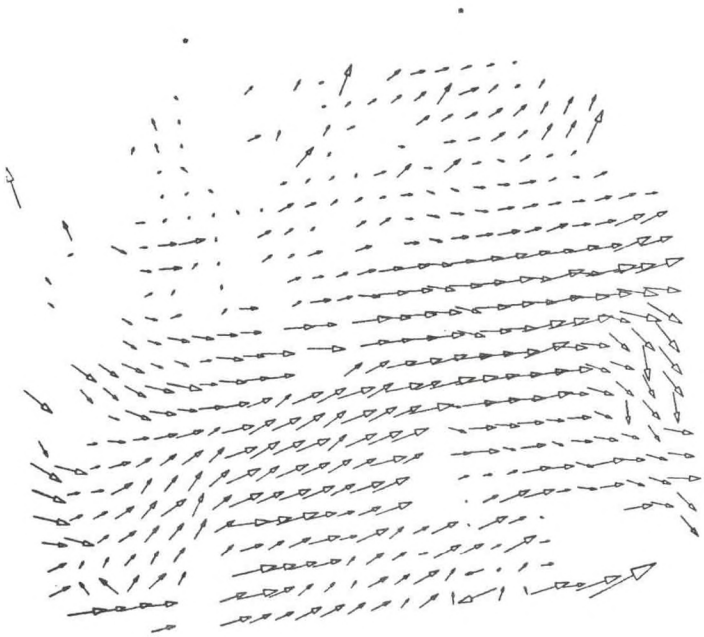


2340 20-OCT-82
2350 20-OCT-82

8.0 KM , 200.0 CM/S

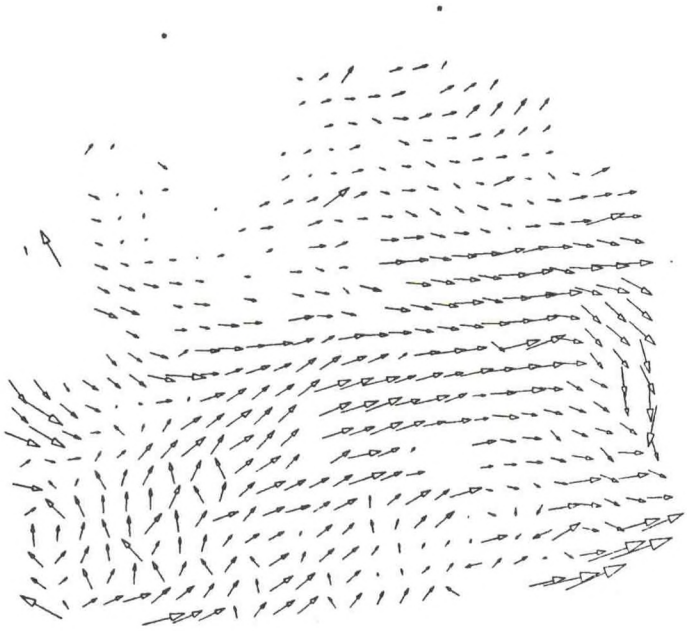
TRUE NORTH



0040 21-OCT-82
0050 21-OCT-82

8.0 KM , 200.0 CM/S

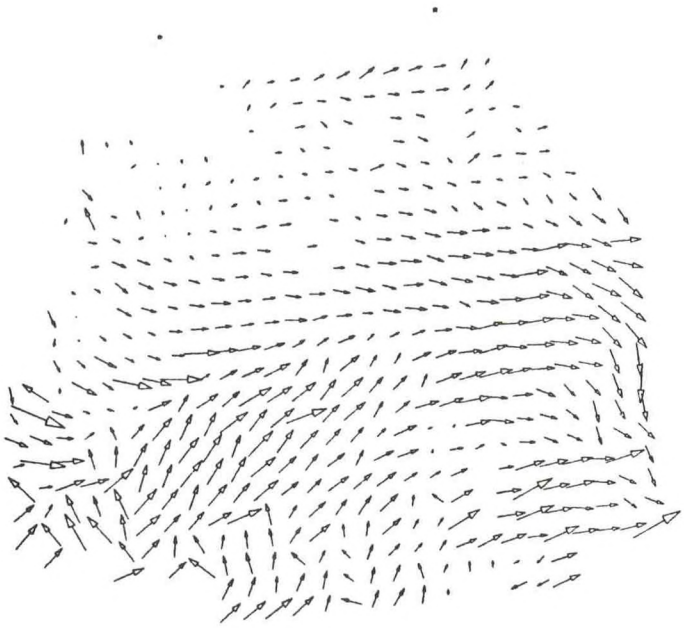
TRUE NORTH



0140 21-OCT-82
0150 21-OCT-82

8.0 KM , 200.0 CM/S

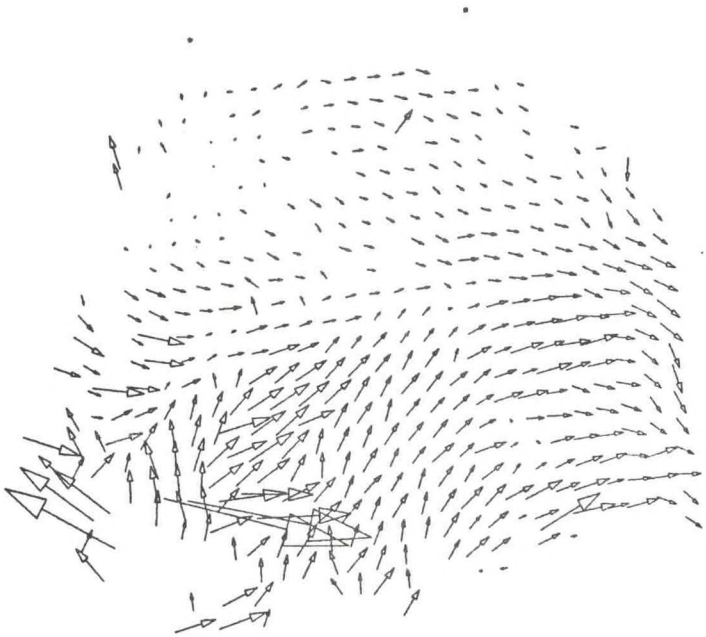
TRUE NORTH



0240 21-OCT-82
0250 21-OCT-82

8.0 KM , 200.0 CM/S

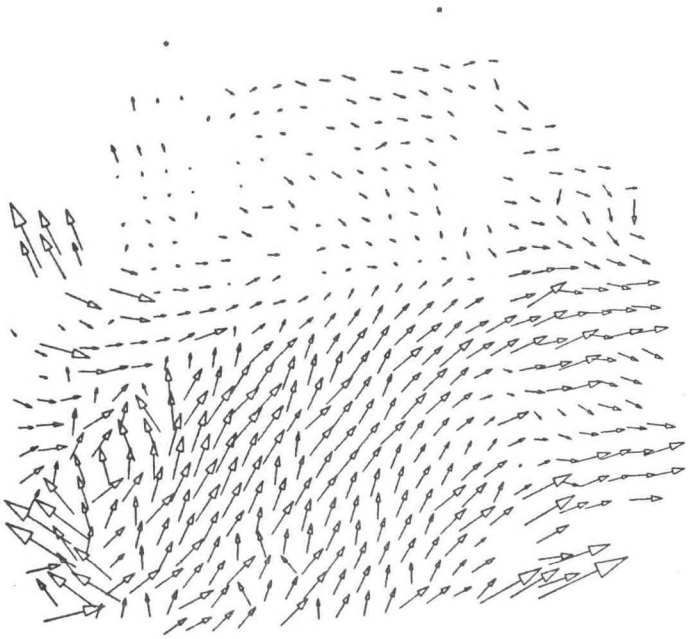
TRUE NORTH ↑



0340 21-OCT-82
0350 21-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑



0440 21-OCT-82
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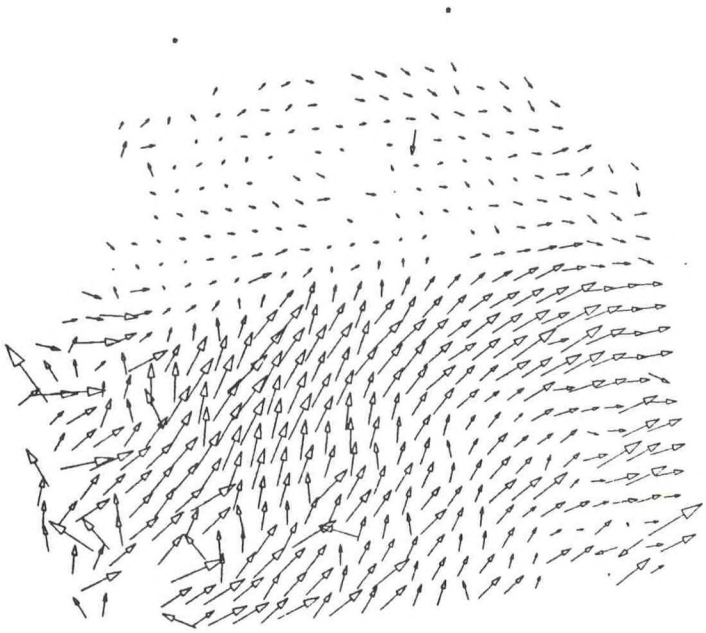
8.0 KM , 200.0 CM/S

TRUE NORTH



0540 21-OCT-82
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8.0 KM , 200.0 CM/S

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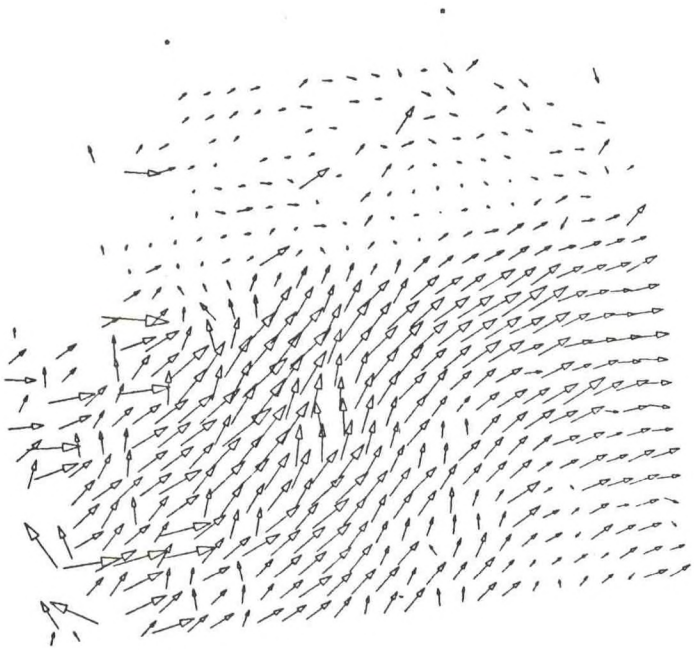

0640 21-OCT-82
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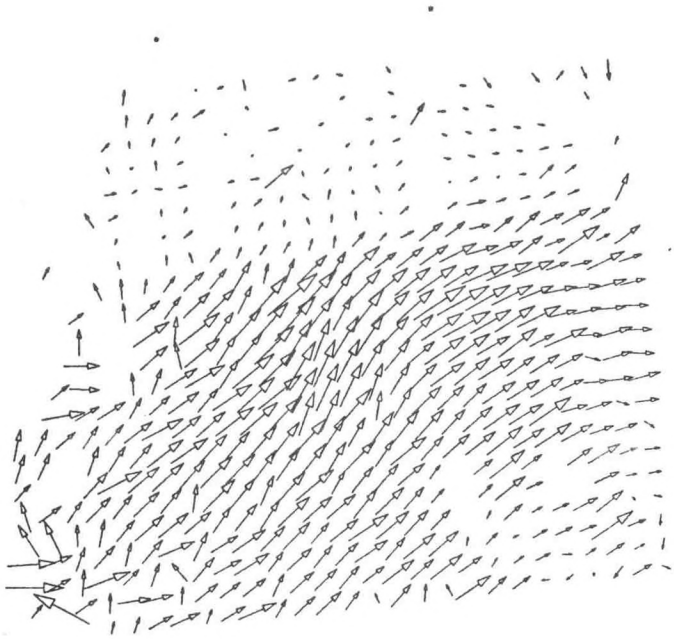
8.0 KM , 200.0 CM/S

TRUE NORTH



0740 21-OCT-82
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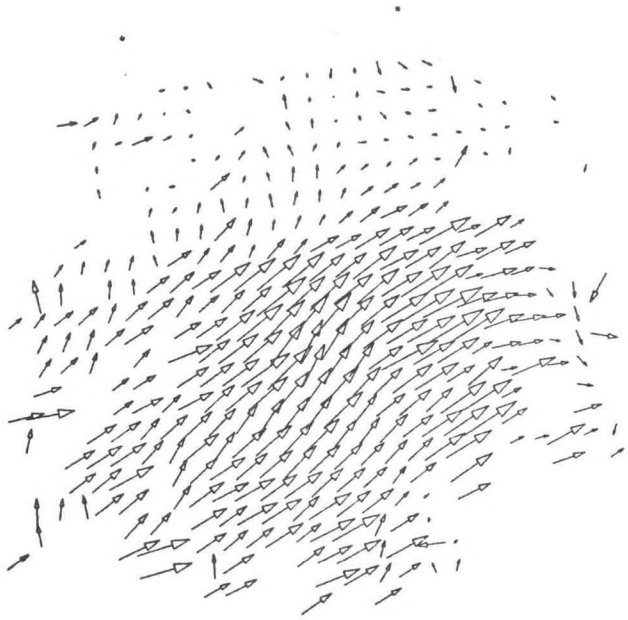
8.0 KM , 200.0 CM/S

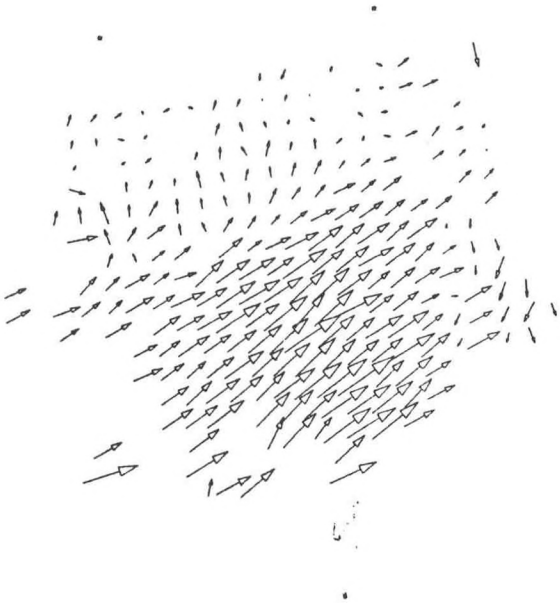
TRUE NORTH



0840 21-OCT-82
0850 21-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0940 21-OCT-82
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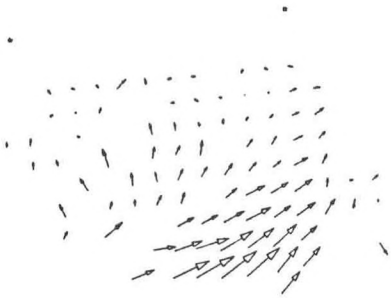
TRUE NORTH



1040 21-OCT-82
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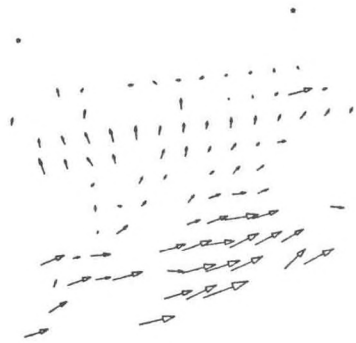
8.0 KM . 200.0 CM/S

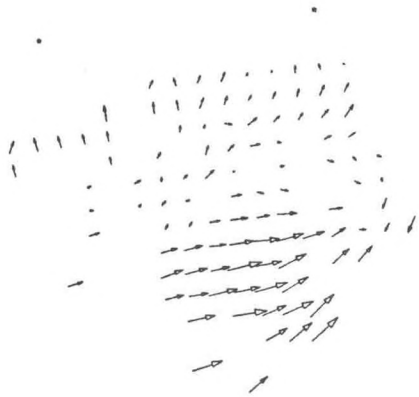
TRUE NORTH



1140 21-OCT-82
1150 21-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



1240 21-OCT-82
1250 21-OCT-82

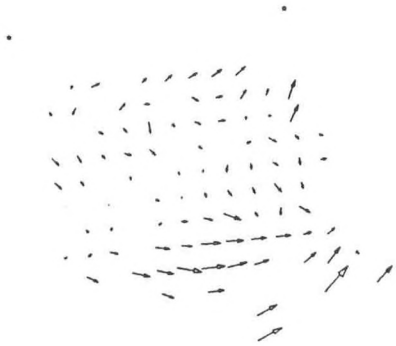
8.0 KM , 200.0 CM/S

TRUE NORTH

1340 21-OCT-82
1350 21-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1440 21-OCT-82
1450 21-OCT-82

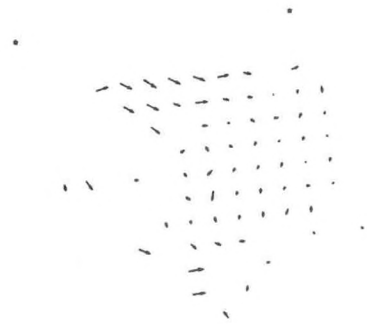
8.0 KM , 200.0 CM/S

TRUE NORTH

1540 21-OCT-82
1550 21-OCT-82

8.0 KM , 200.0 CM/S

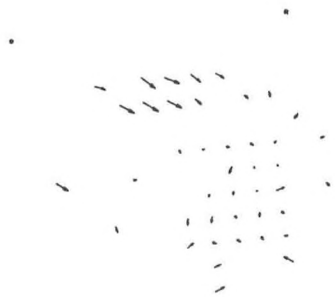
TRUE NORTH



1640 21-OCT-82
1650 21-OCT-82

8.0 KM , 200.0 CM/S

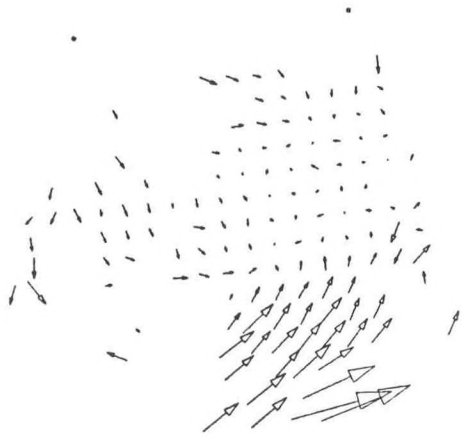
TRUE NORTH



1740 21-OCT-82
1750 21-OCT-82

8.0 KM , 200.0 CM/S

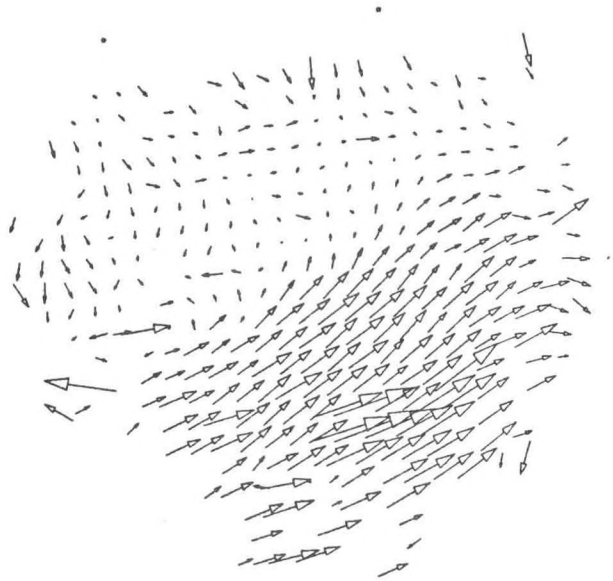
TRUE NORTH



1840 21-OCT-82
1850 21-OCT-82

8.0 KM , 200.0 CM/S

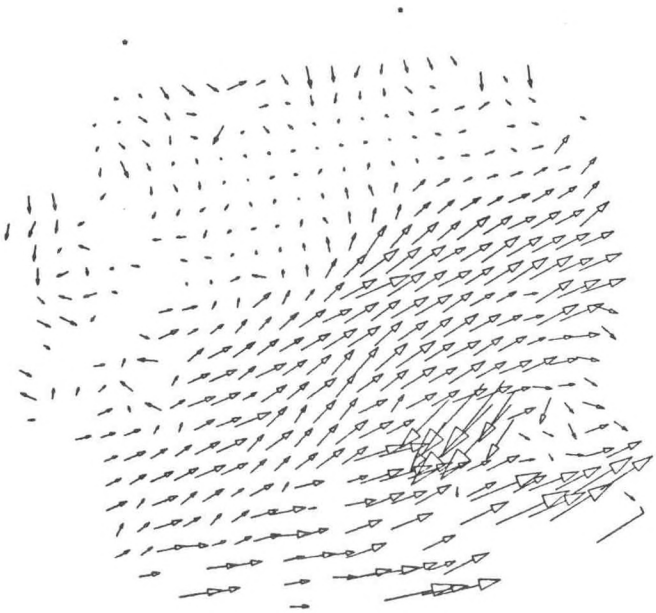
TRUE NORTH



1940 21-OCT-82
1950 21-OCT-82

8.0 KM , 200.0 CM/S

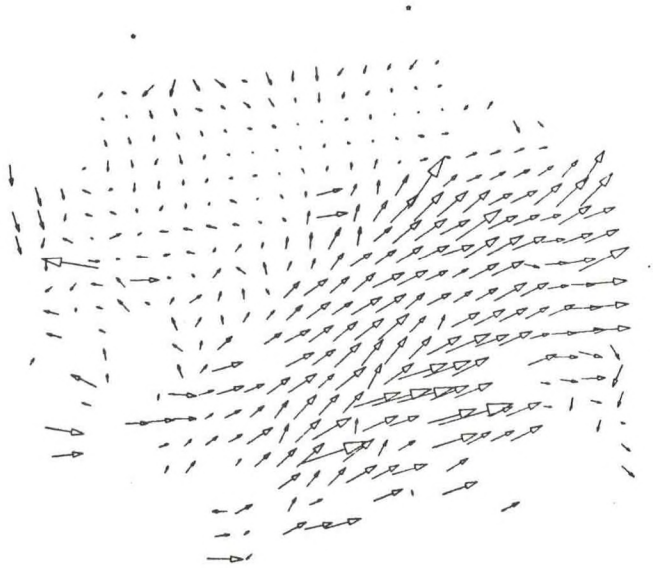
TRUE NORTH



2040 21-OCT-82
2050 21-OCT-82

8.0 KM , 200.0 CM/S

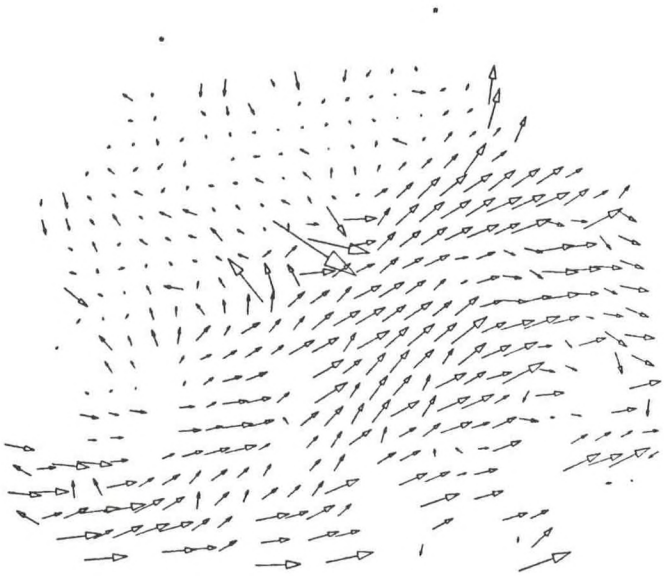
TRUE NORTH



2140 21-OCT-82
2150 21-OCT-82

8.0 KM , 200.0 CM/S

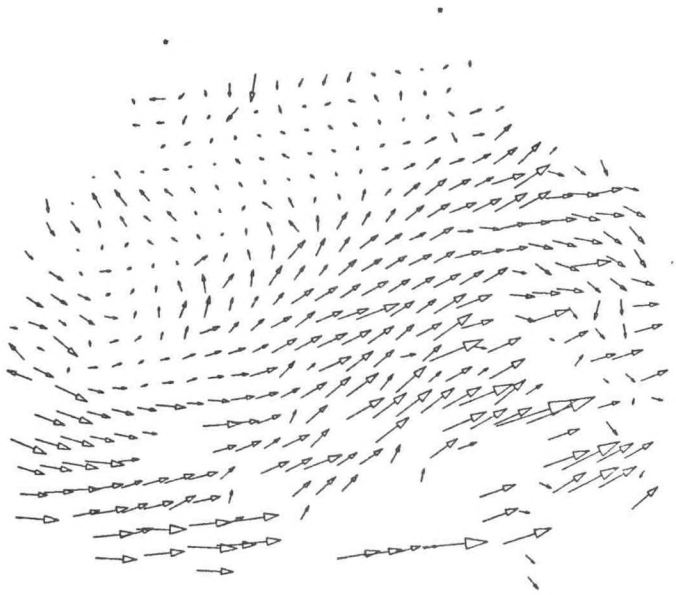
TRUE NORTH



2240 21-OCT-82
2250 21-OCT-82

8.0 KM . 200.0 CM/S

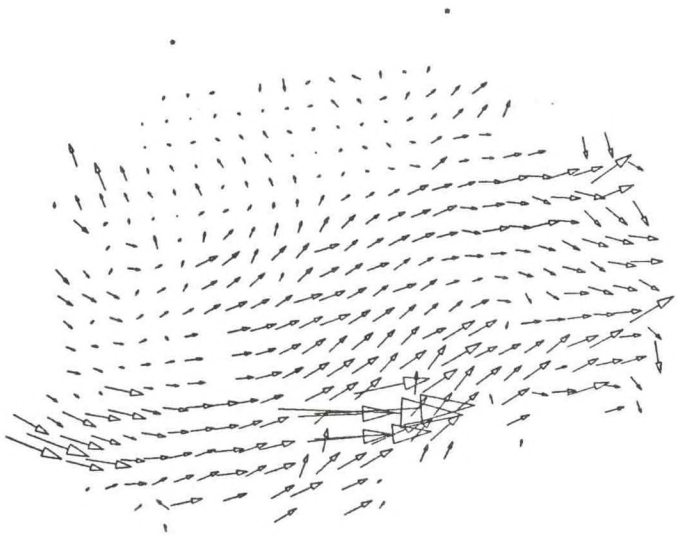
TRUE NORTH



2340 21-OCT-82
2350 21-OCT-82

8.0 KM . 200.0 CM/S

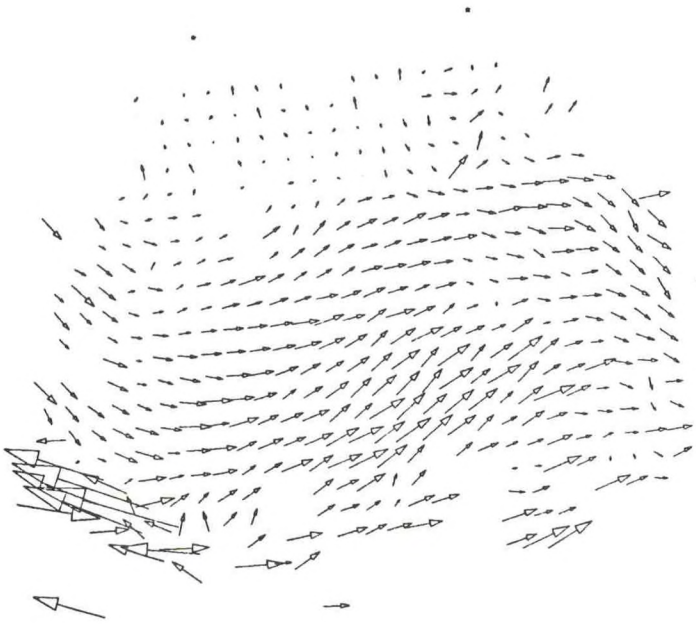
TRUE NORTH



0040 22-OCT-82
0050 22-OCT-82

8.0 KM , 200.0 CM/S

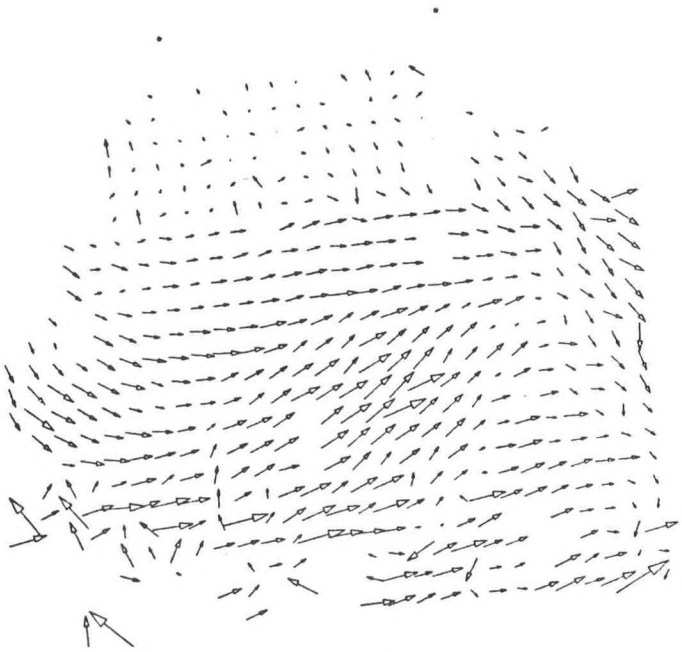
TRUE NORTH



0140 22-OCT-82
0150 22-OCT-82

8.0 KM , 200.0 CM/S

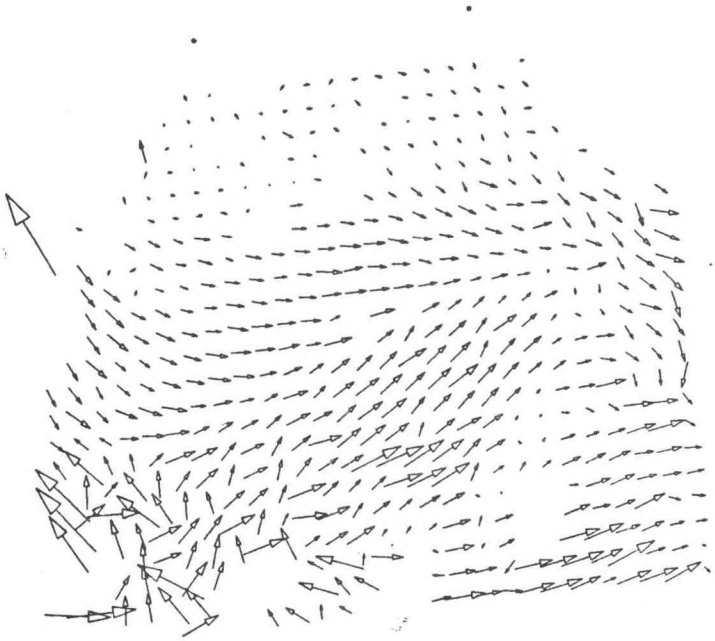
TRUE NORTH



0240 22-OCT-82
0250 22-OCT-82

8.0 KM , 200.0 CM/S

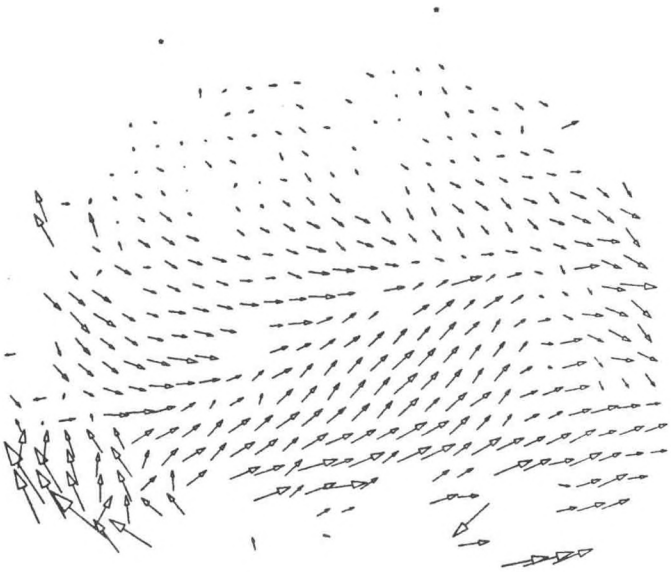
TRUE NORTH



0340 22-OCT-82
0350 22-OCT-82

8.0 KM , 200.0 CM/S

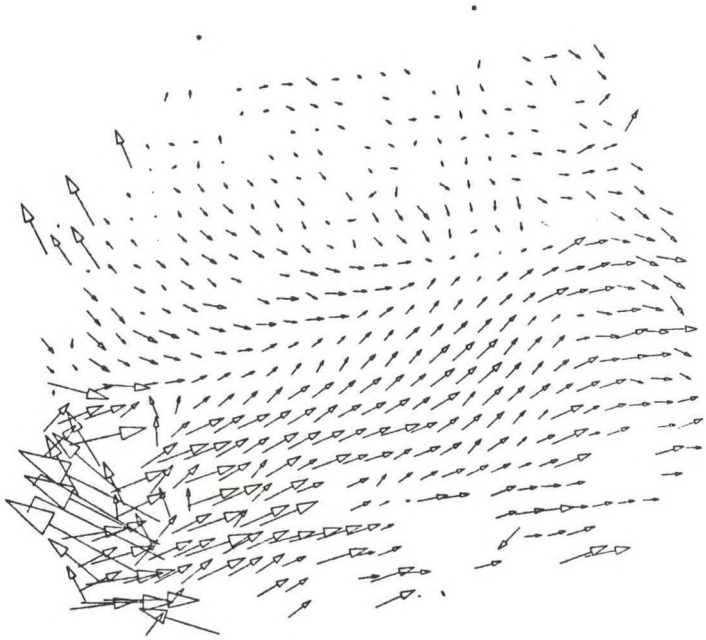
TRUE NORTH



0440 22-OCT-82
0450 22-OCT-82

8.0 KM , 200.0 CM/S

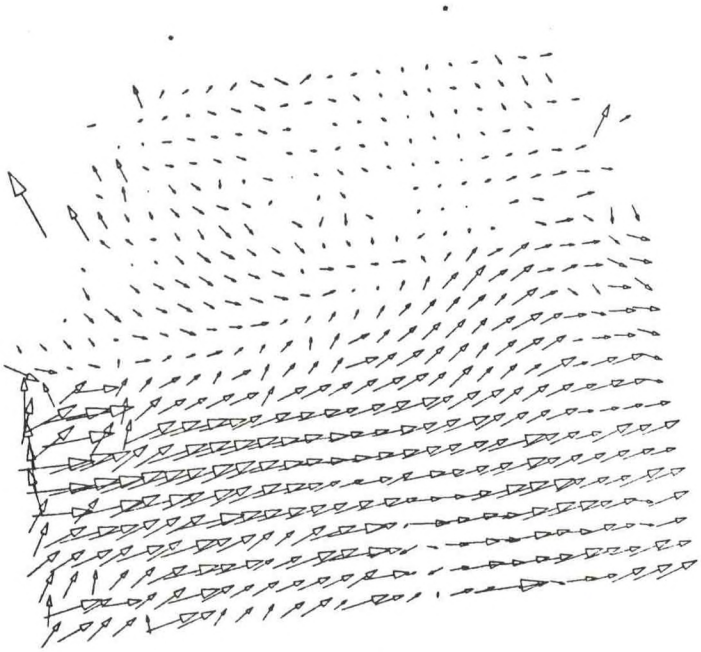
TRUE NORTH



0540 22-OCT-82
0550 22-OCT-82

8.0 KM , 200.0 CM/S

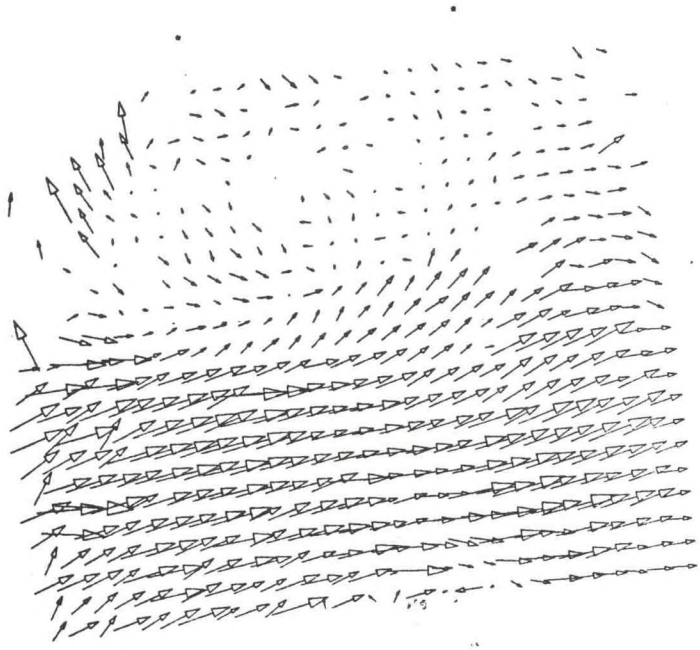
TRUE NORTH



0640 22-OCT-82
0650 22-OCT-82

8.0 KM , 200.0 CM/S

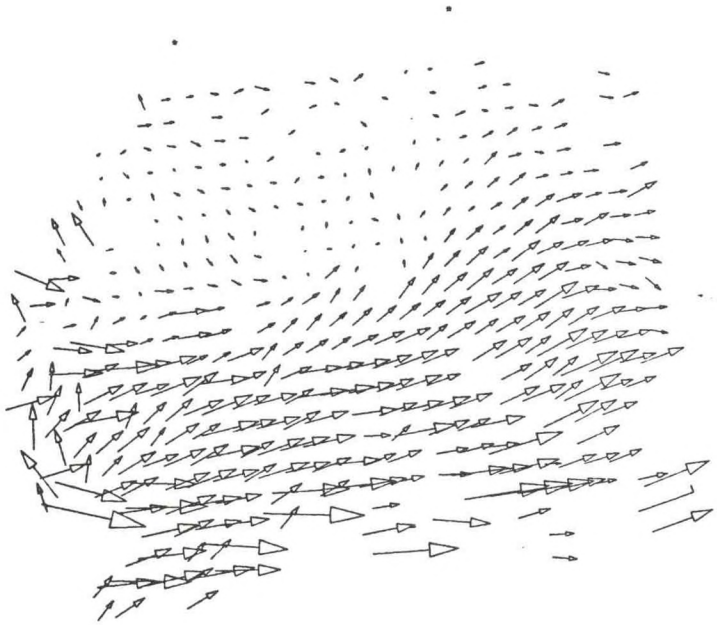
TRUE NORTH



0740 22-OCT-82
0750 22-OCT-82

8.0 KM , 200.0 CM/S

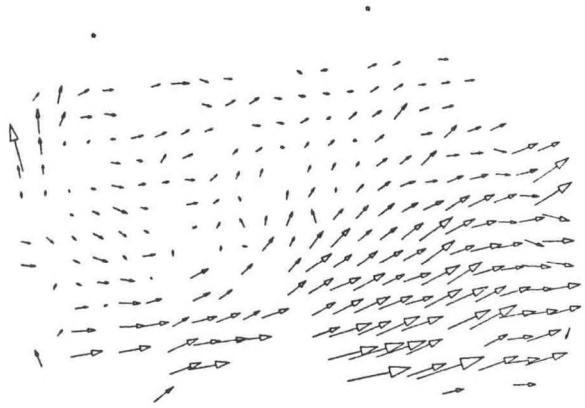
TRUE NORTH



0840 22-OCT-82
0850 22-OCT-82

8.0 KM , 200.0 CM/S

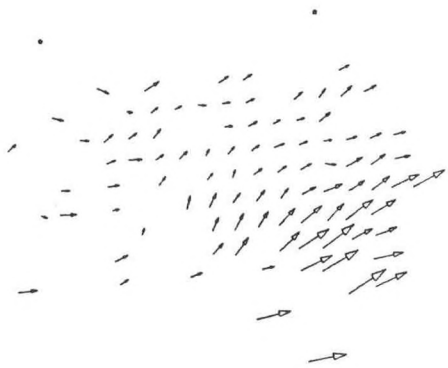
TRUE NORTH



0940 22-OCT-82
0950 22-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1040 22*OCT*82
1050 22-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1140 22*OCT*82
1150 22-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

1240 22*OCT*82
1250 22-OCT-82

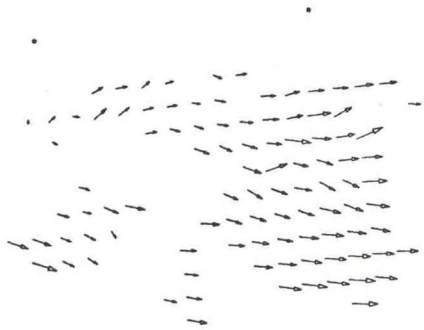
8.0 KM , 200.0 CM/S

TRUE NORTH

1340 22-OCT-82
1350 22-OCT-82

8.0 KM , 200.0 CM/S

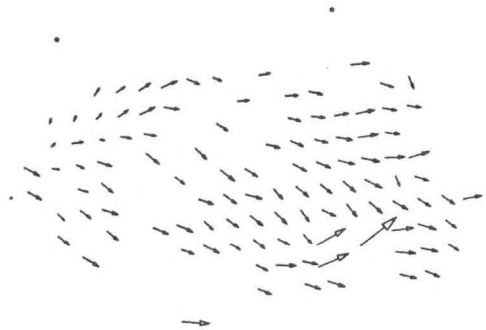
TRUE NORTH



1440 22-OCT-82
1450 22-OCT-82

8.0 KM , 200.0 CM/S

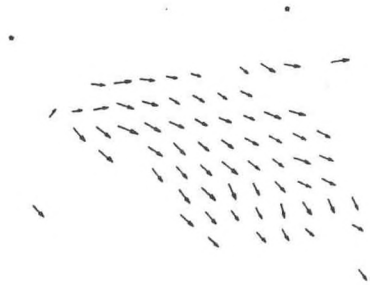
TRUE NORTH



1540 22-OCT-82
1550 22-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1640 22-OCT-82
1650 22-OCT-82

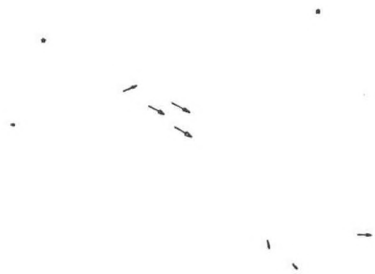
8.0 KM , 200.0 CM/S

TRUE NORTH

1740 22-OCT-82
1750 22-OCT-82

8.0 KM , 200.0 CM/S

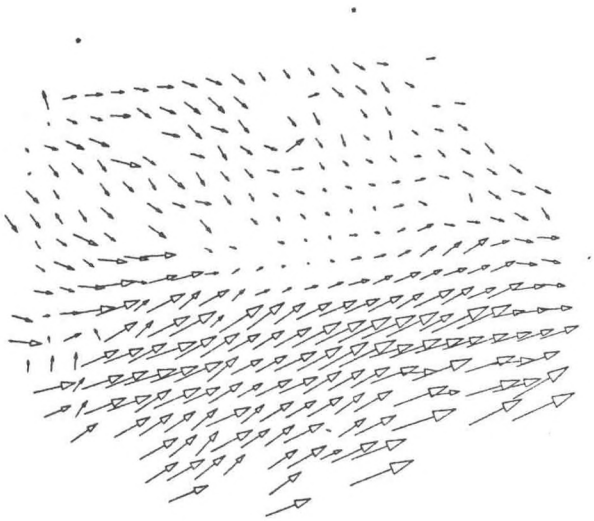
TRUE NORTH



1840 22-OCT-82
1850 22-OCT-82

8.0 KM , 200.0 CM/S

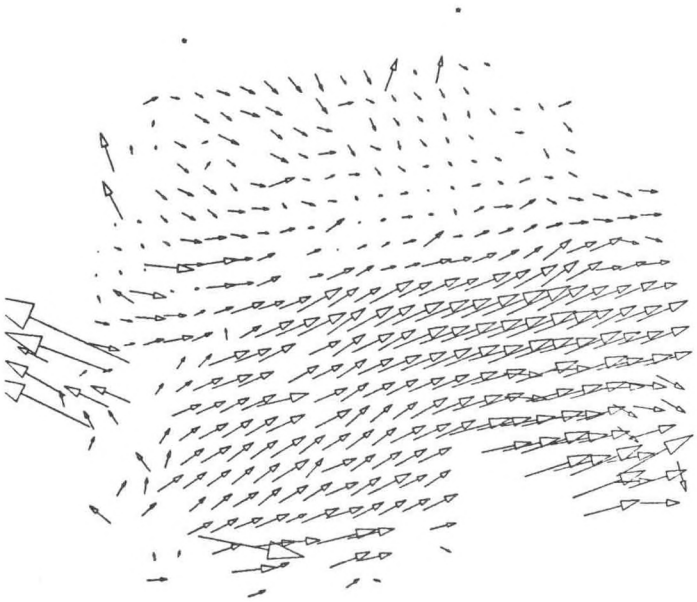
TRUE NORTH



1940 22-OCT-82
1950 22-OCT-82

8.0 KM , 200.0 CM/S

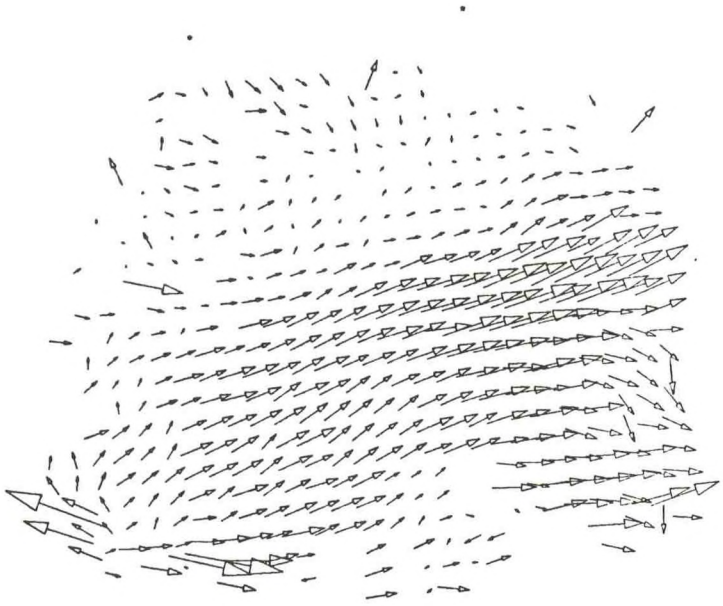
TRUE NORTH



2040 22-OCT-82
2050 22-OCT-82

8.0 KM , 200.0 CM/S

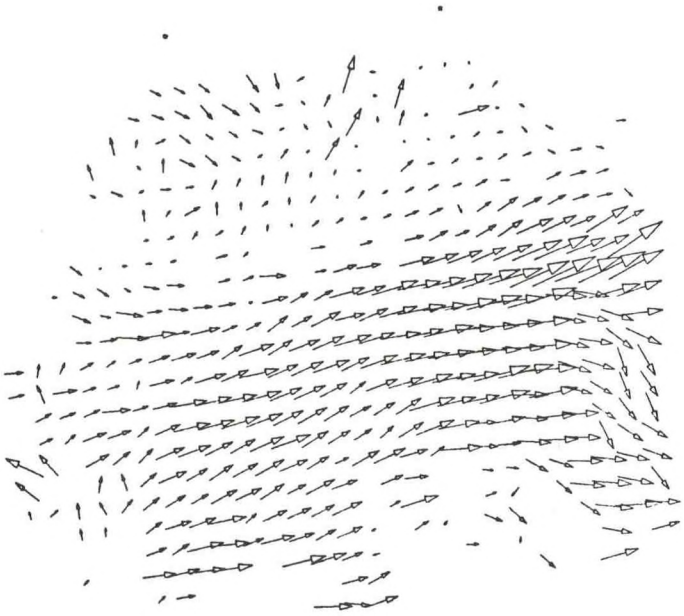
TRUE NORTH



2140 22-OCT-82
2150 22-OCT-82

8.0 KM , 200.0 CM/S

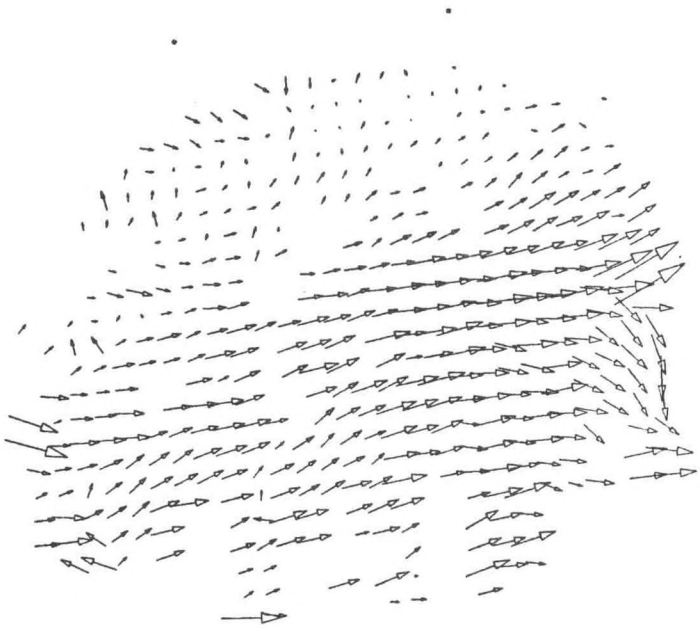
TRUE NORTH



2240 22-OCT-82
2250 22-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

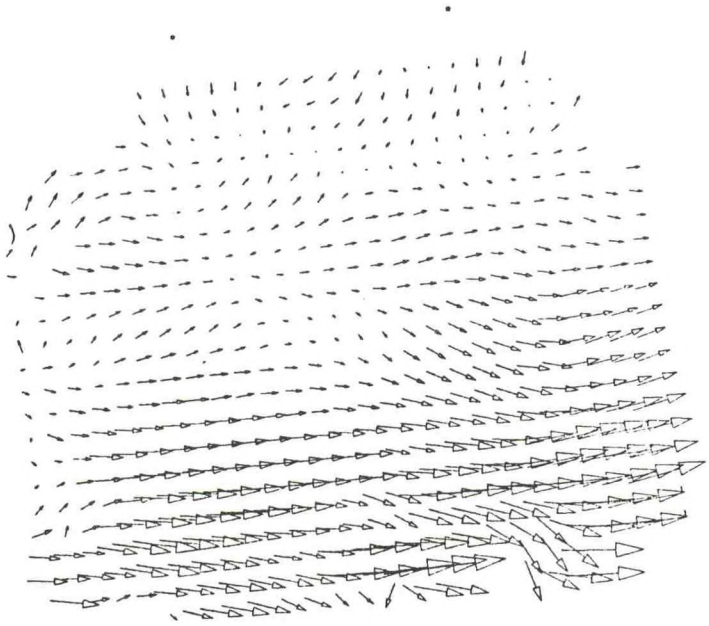


Appendix B. Current Velocity Maps Averaged Areally

2040 07-OCT-82
2050 07-OCT-82

8.0 KM , 200.0 CM/S

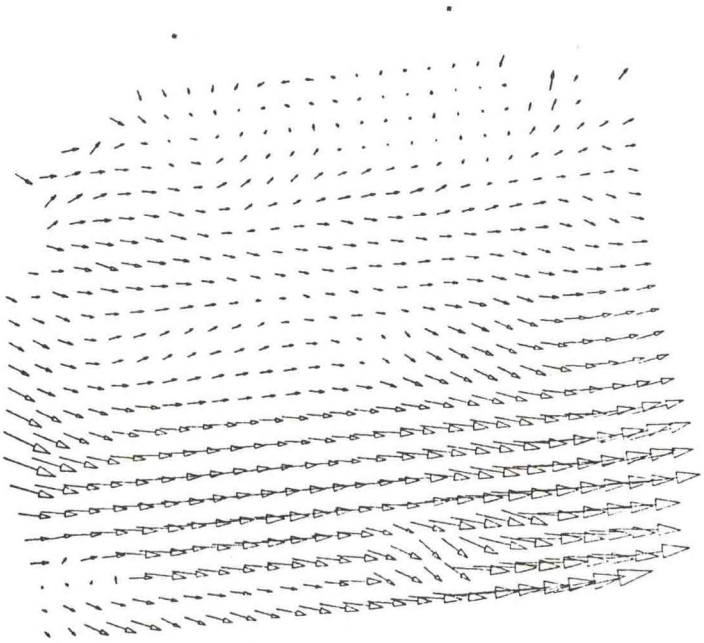
TRUE NORTH



2140 07-OCT-82
2150 07-OCT-82

8.0 KM , 200.0 CM/S

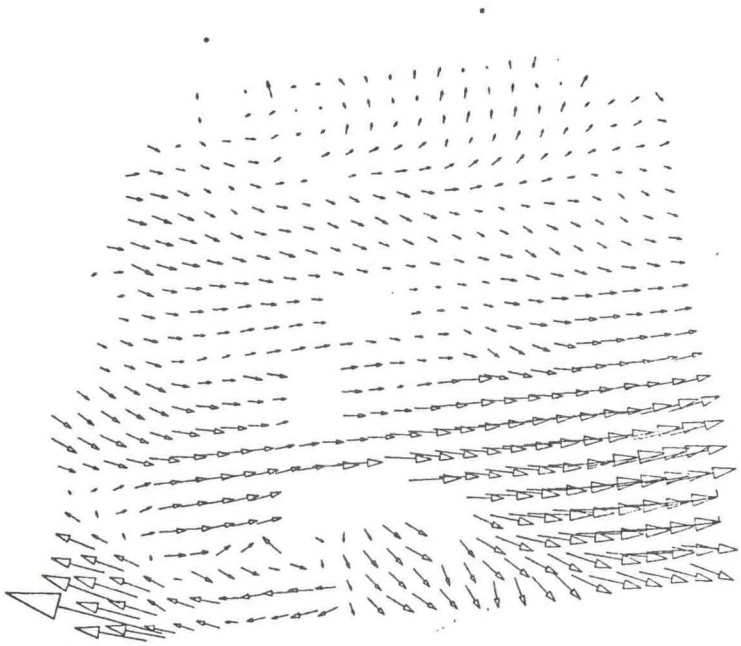
TRUE NORTH



2240 07-OCT-82
2250 07*OCT*82

8.0 KM . 200.0 CM/S

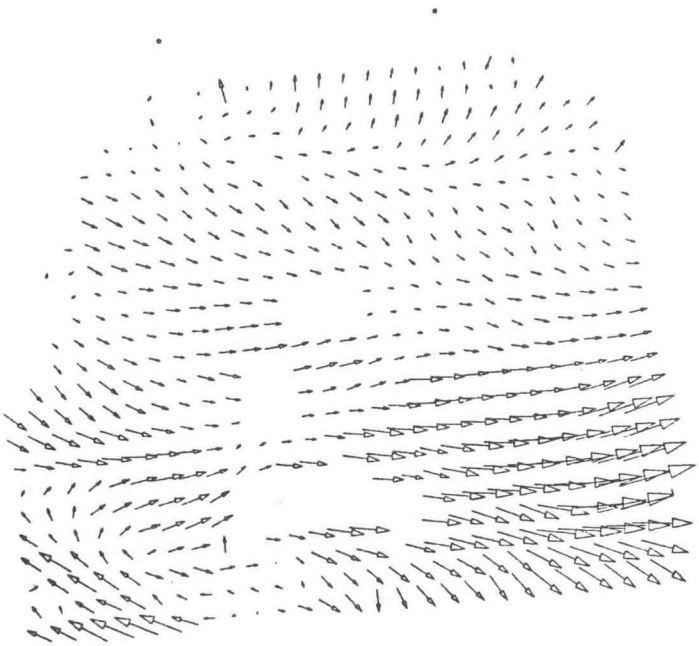
TRUE NORTH ↑



2340 07-OCT-82
2350 07*OCT*82

8.0 KM . 200.0 CM/S

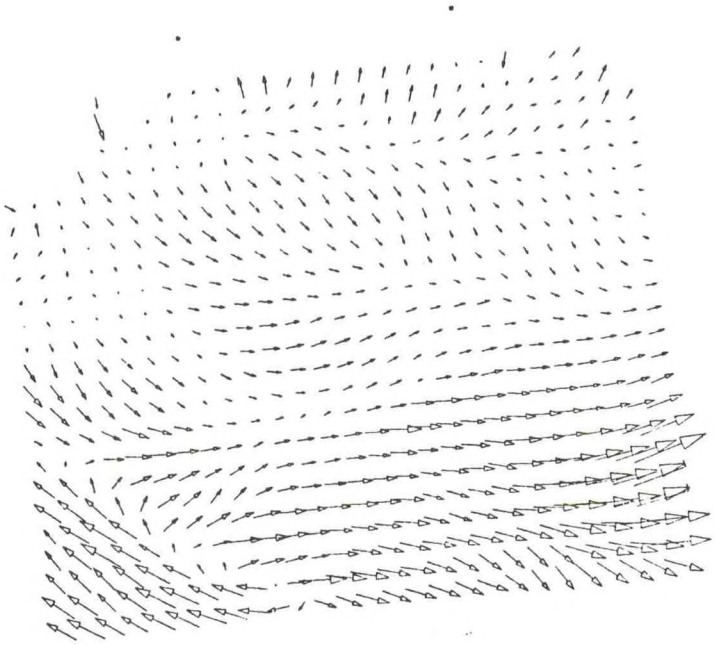
TRUE NORTH ↑



0040 08-OCT-82
0050 08-OCT-82

8.0 KM , 200.0 CM/S

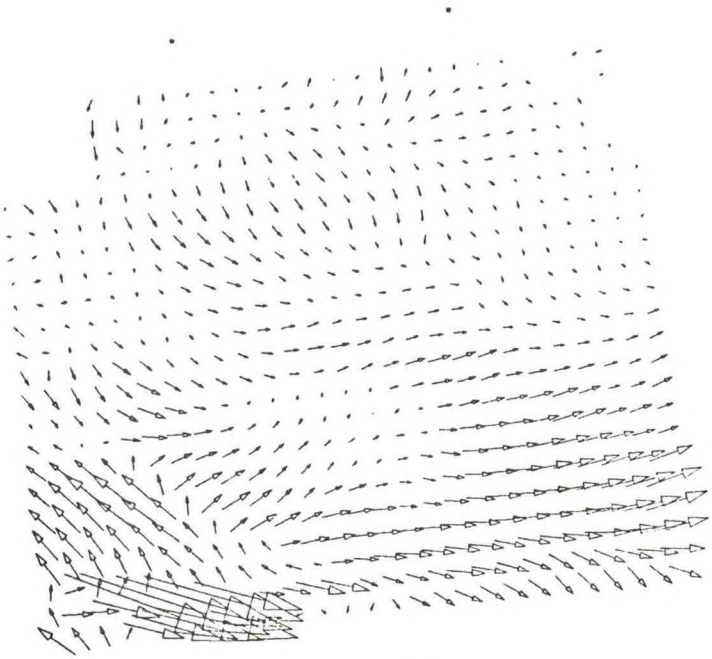
TRUE NORTH



0140 08-OCT-82
0150 08-OCT-82

8.0 KM , 200.0 CM/S

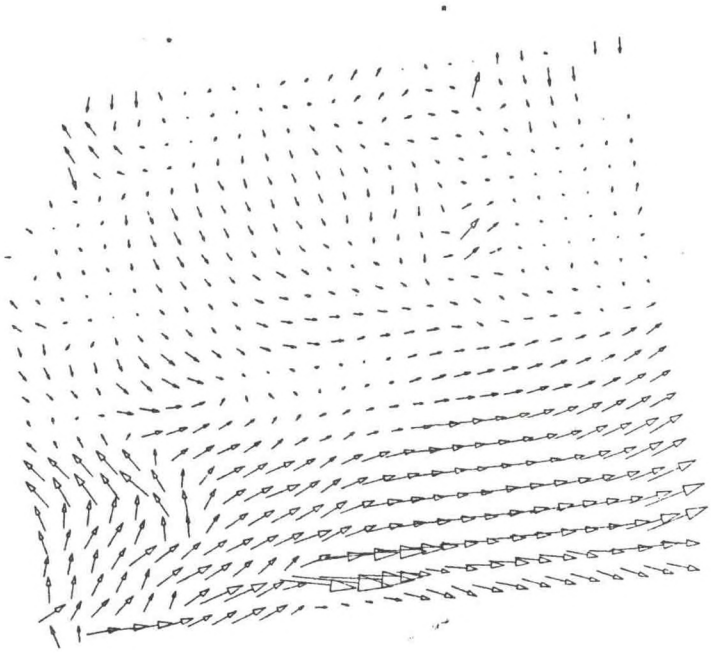
TRUE NORTH



0240 08-OCT-82
0250 08-OCT-82

8.0 KM , 200.0 CM/S

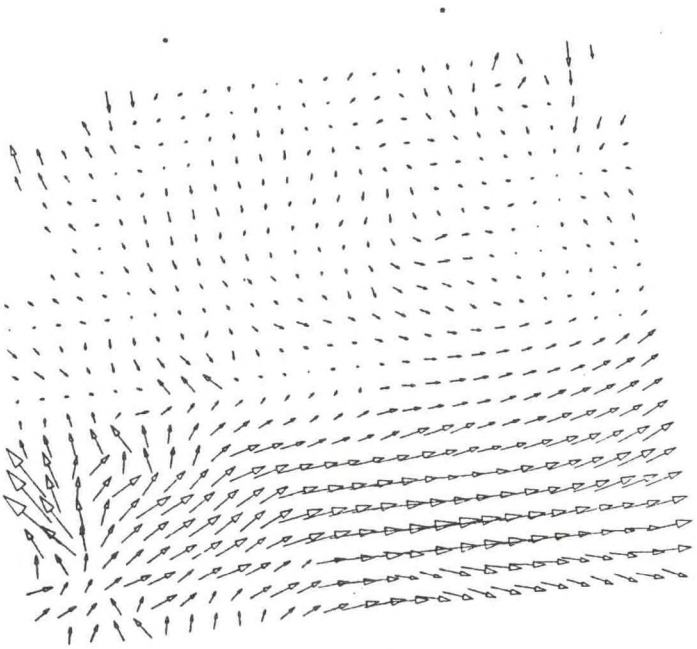
TRUE NORTH



0340 08-OCT-82
0350 08-OCT-82

8.0 KM , 200.0 CM/S

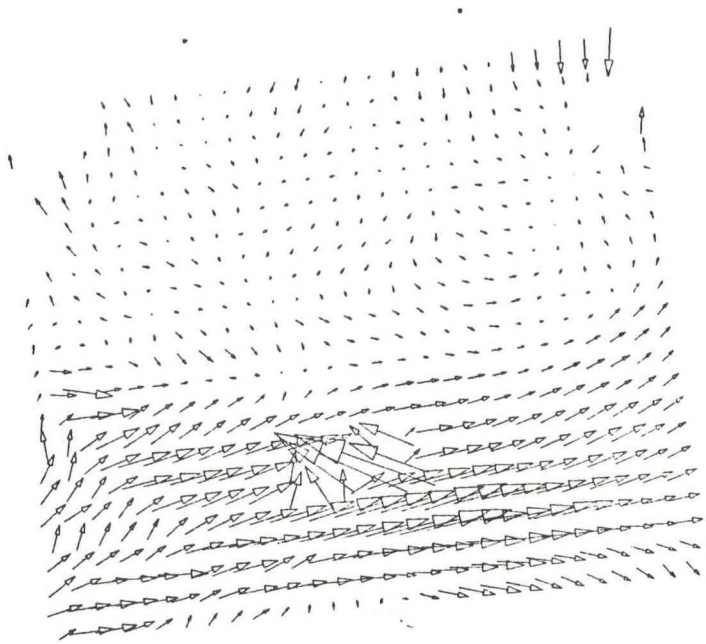
TRUE NORTH



0440 08-OCT-82
0450 08-OCT-82

8.0 KM , 200.0 CM/S

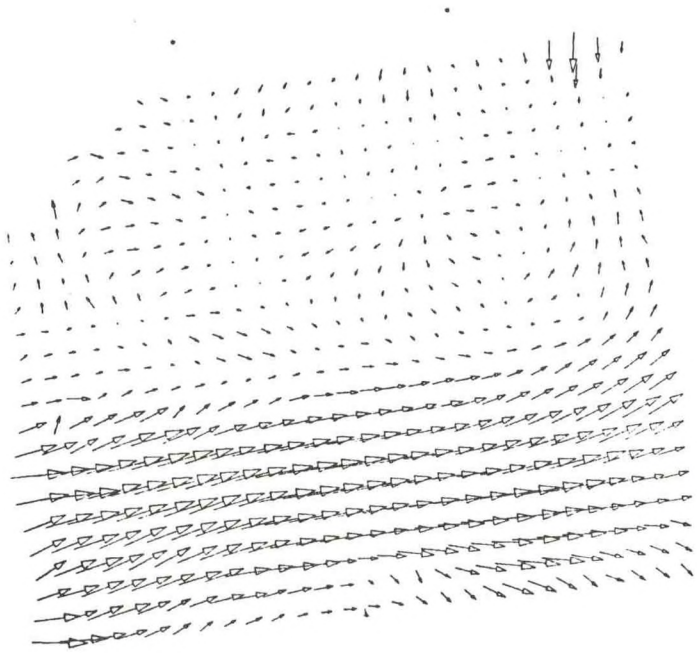
TRUE NORTH



0540 08-OCT-82
0550 08-OCT-82

8.0 KM , 200.0 CM/S

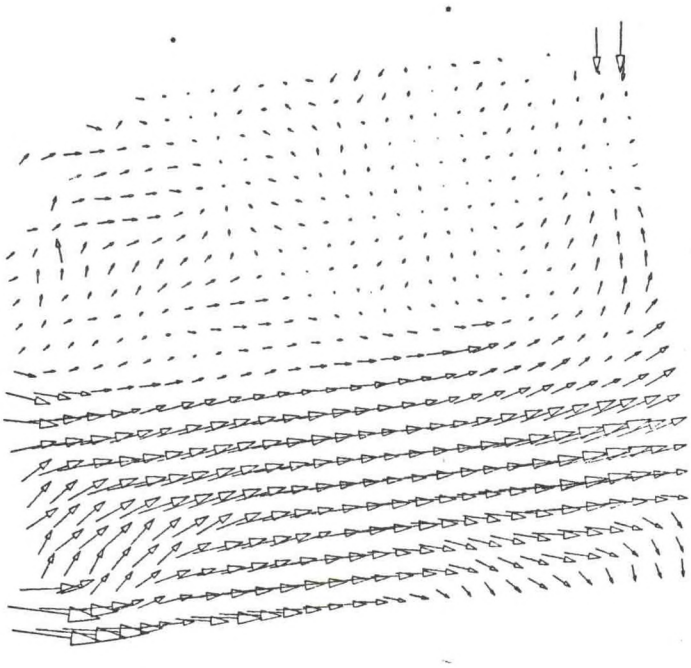
TRUE NORTH



0640 08-OCT-82
0650 08-OCT-82

8.0 KM , 200.0 CM/S

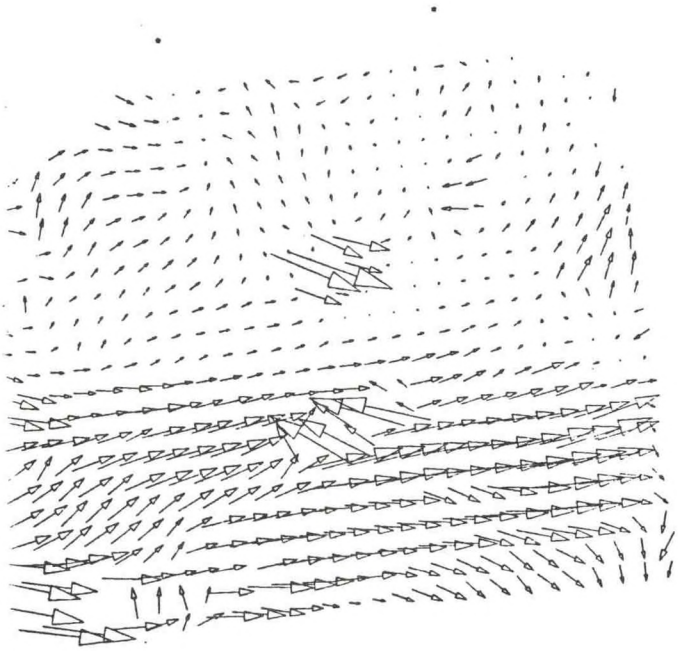
TRUE NORTH



0740 08*OCT*82
0750 08-OCT-82

8.0 KM , 200.0 CM/S

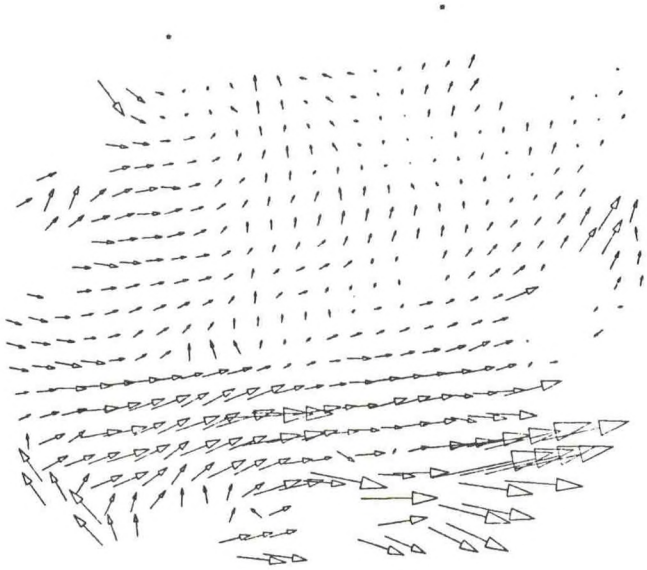
TRUE NORTH



0840 08-OCT-82
0850 08*OCT*82

8.0 KM , 200.0 CM/S

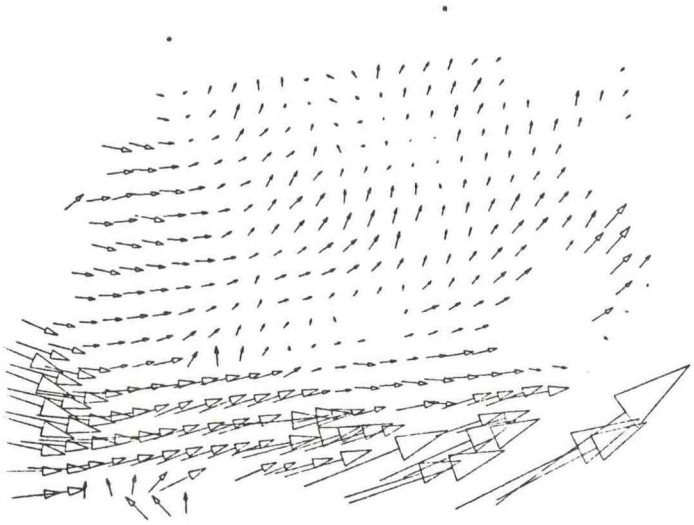
TRUE NORTH



0940 08*OCT*82
0950 08*OCT*82

8.0 KM , 200.0 CM/S

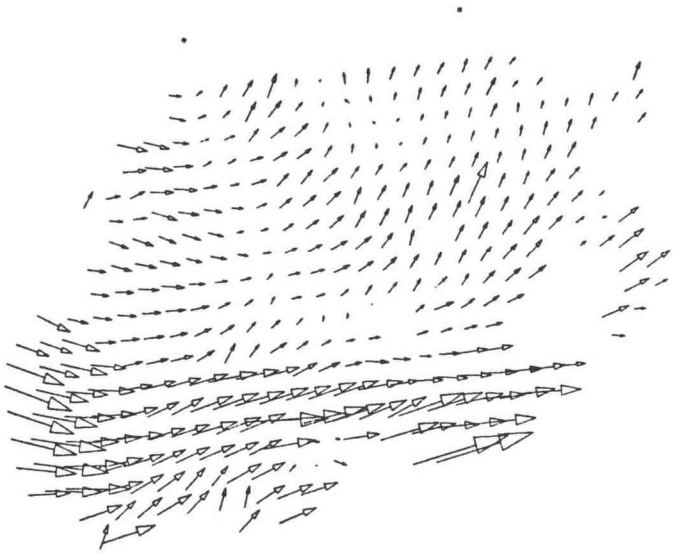
TRUE NORTH



1040 08-OCT-82
1050 08-OCT-82

8.0 KM , 200.0 CM/S

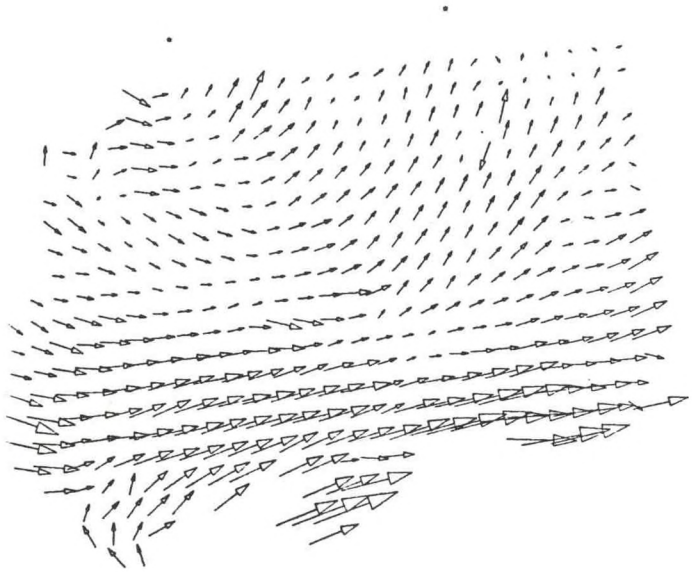
TRUE NORTH



1140 08-OCT-82
1150 08-OCT-82

8.0 KM , 200.0 CM/S

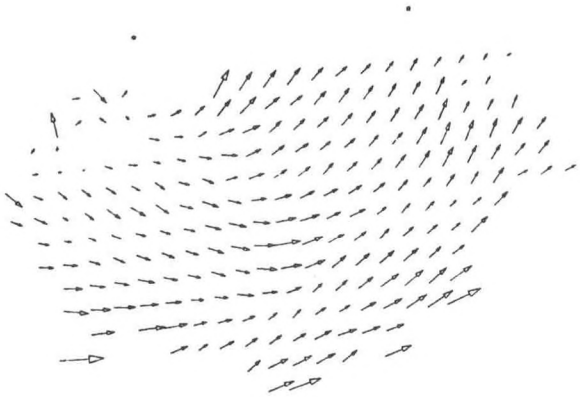
TRUE NORTH



1240 08-OCT-82
1250 08-OCT-82

8.0 KM , 200.0 CM/S

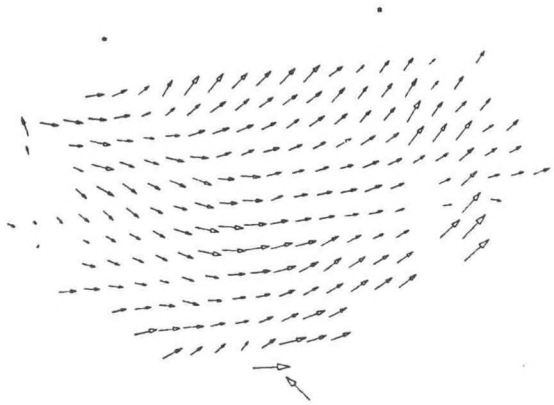
TRUE NORTH



1340 08-OCT-82
1350 08-OCT-82

8.0 KM , 200.0 CM/S

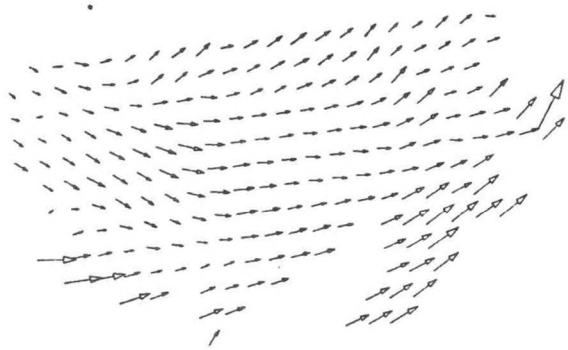
TRUE NORTH



1440 08-OCT-82
1450 08-OCT-82

8.0 KM . 200.0 CM/S

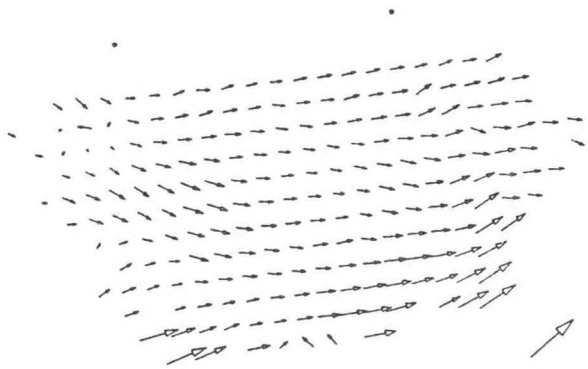
TRUE NORTH



1540 08-OCT-82
1550 08-OCT-82

8.0 KM . 200.0 CM/S

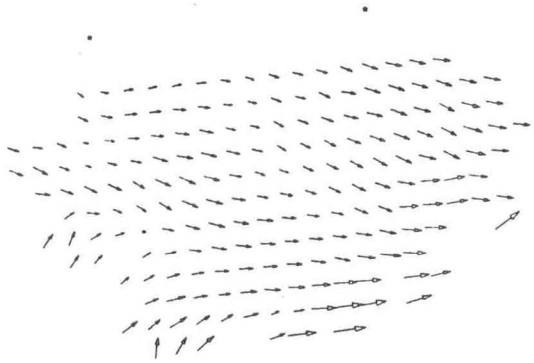
TRUE NORTH



1640 08-OCT-82
1650 08-OCT-82

8.0 KM , 200.0 CM/S

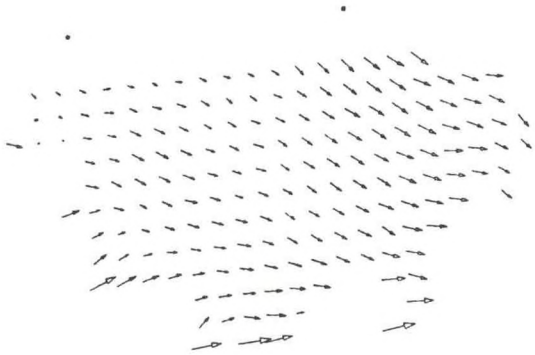
TRUE NORTH



1740 08-OCT-82
1750 08-OCT-82

8.0 KM , 200.0 CM/S

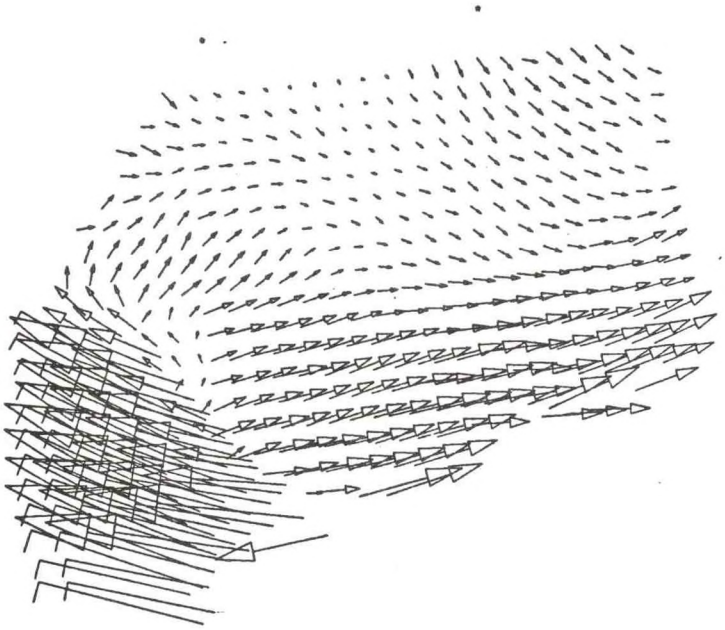
TRUE NORTH



1840 08-OCT-82
1850 08-OCT-82

8.0 KM . 200.0 CM/S

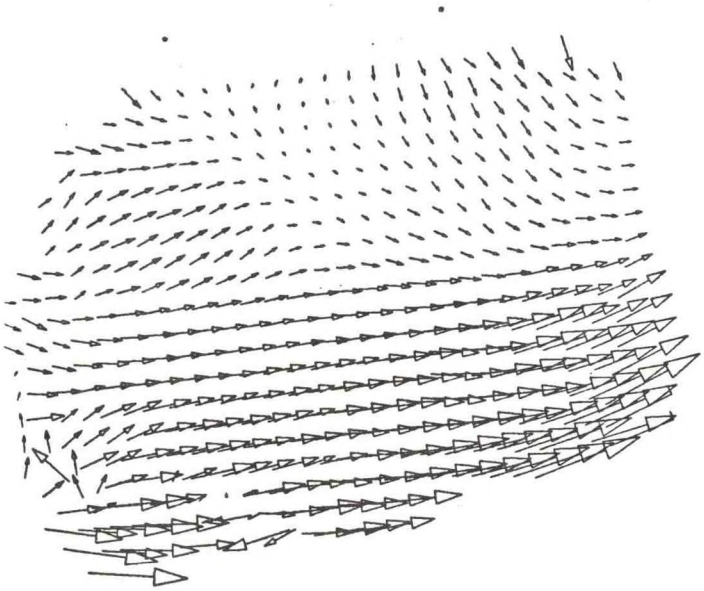
TRUE NORTH



1940 08-OCT-82
1950 08-OCT-82

8.0 KM . 200.0 CM/S

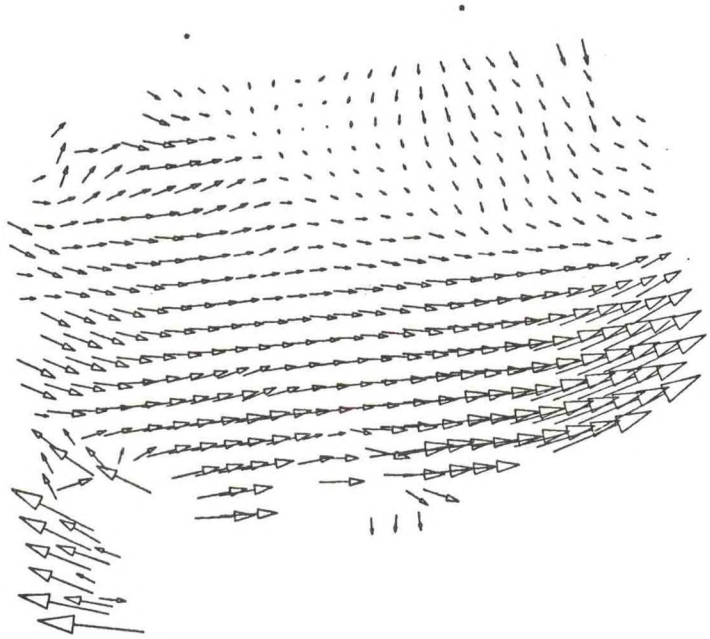
TRUE NORTH



2040 08-OCT-82
2050 08-OCT-82

8.0 KM , 200.0 CM/S

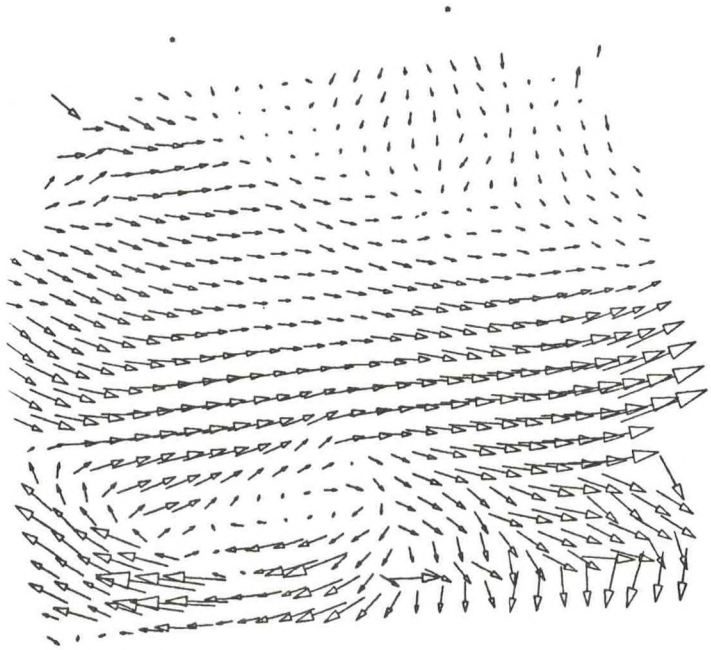
TRUE NORTH



2140 08-OCT-82
2150 08-OCT-82

8.0 KM , 200.0 CM/S

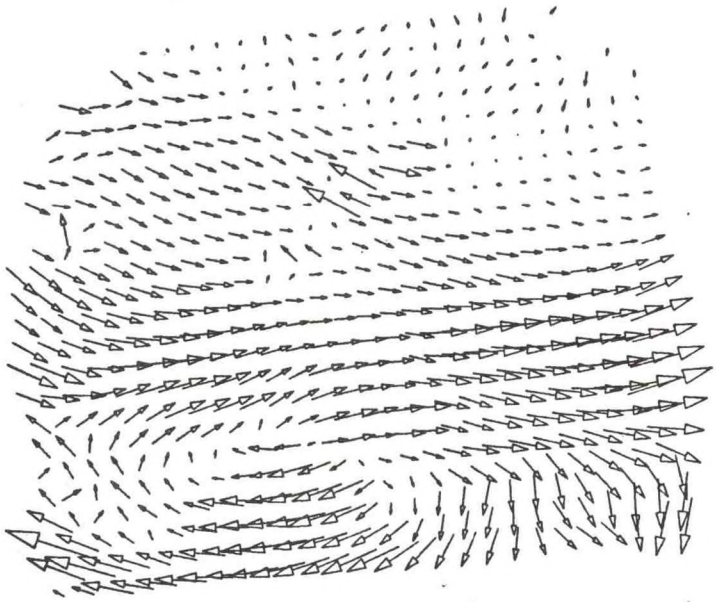
TRUE NORTH



2240 08-OCT-82
2250 08-OCT-82

8.0 KM , 200.0 CM/S

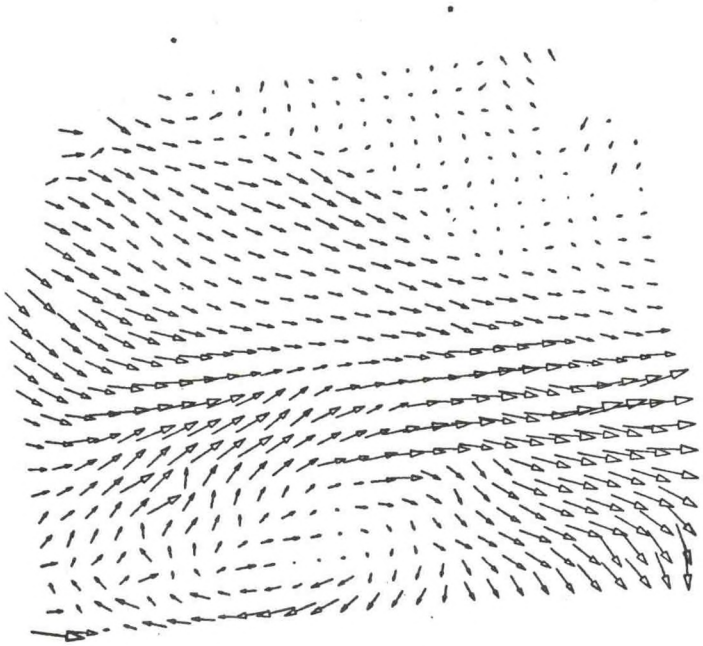
TRUE NORTH



2340 08-OCT-82
2350 08-OCT-82

8.0 KM , 200.0 CM/S

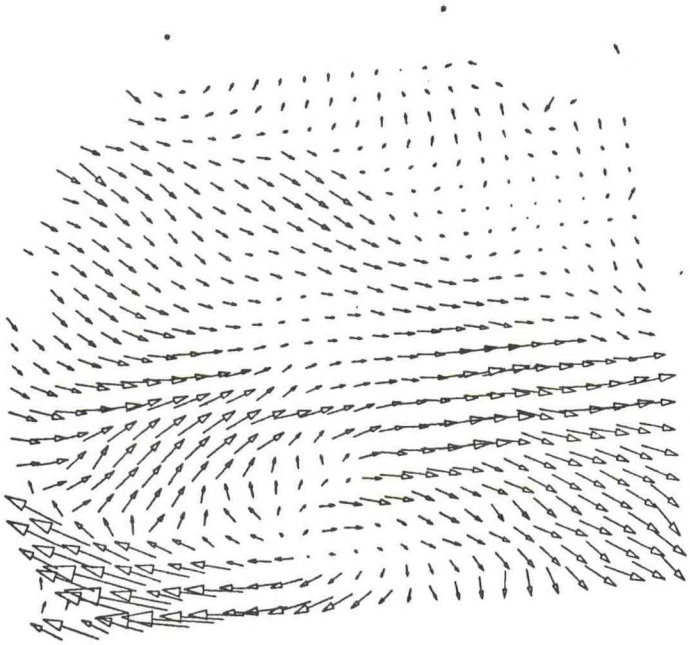
TRUE NORTH



0040 09-OCT-82
0050 09-OCT-82

8.0 KM , 200.0 CM/S

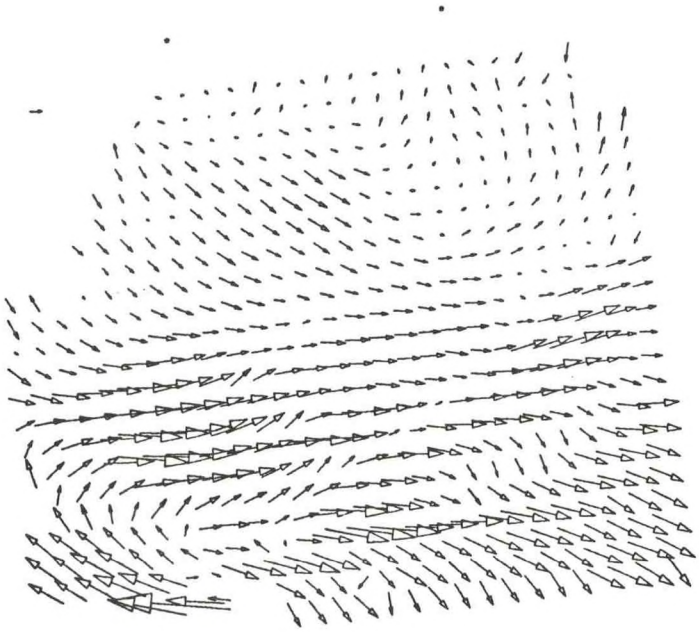
TRUE NORTH



0140 09-OCT-82
0150 09-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0240 09-OCT-82
0250 09-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑

0340 09-OCT-82
0350 09-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑

0440 09-OCT-82
0450 09-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

0540 09-OCT-82
0550 09-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH

0640 09-OCT-82
0650 09-OCT-82

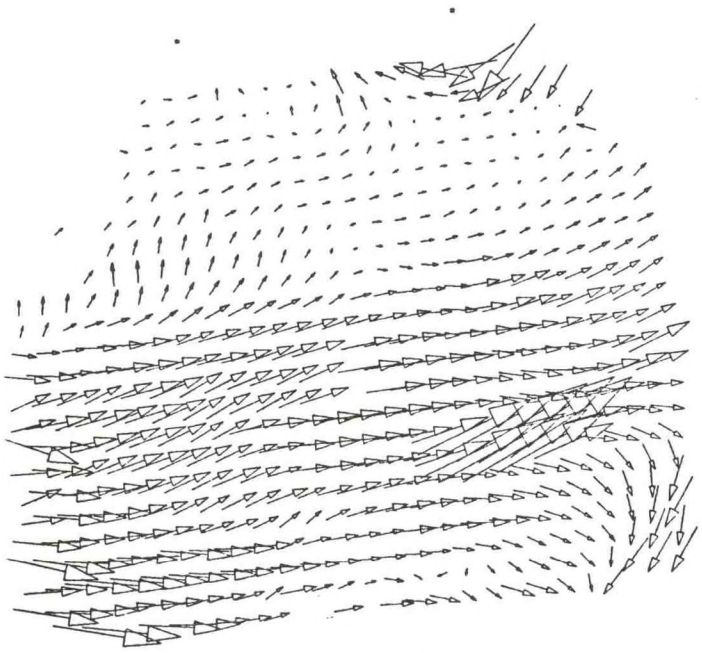
8.0 KM , 200.0 CM/S

TRUE NORTH

0740 09-OCT-82
0750 09-OCT-82

8.0 KM , 200.0 CM/S

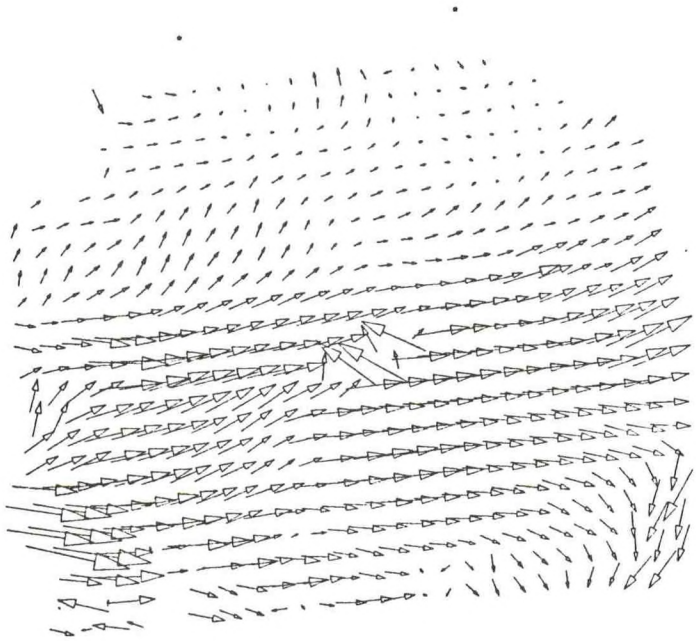
TRUE NORTH



0840 09-OCT-82
0850 09-OCT-82

8.0 KM , 200.0 CM/S

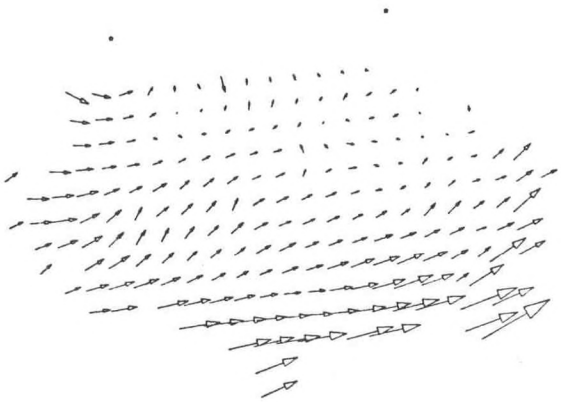
TRUE NORTH



0940 09-OCT-82
0950 09-OCT-82

8.0 KM , 200.0 CM/S

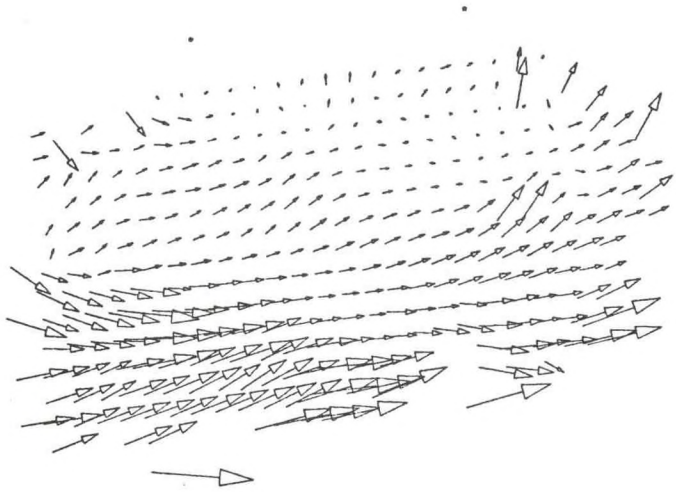
TRUE NORTH



1040 09-OCT-82
1050 09-OCT-82

8.0 KM , 200.0 CM/S

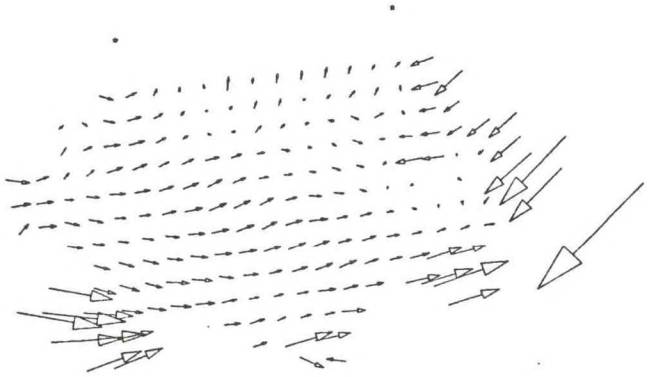
TRUE NORTH



1140 09-OCT-82
1150 09-OCT-82

8.0 KM , 200.0 CM/S

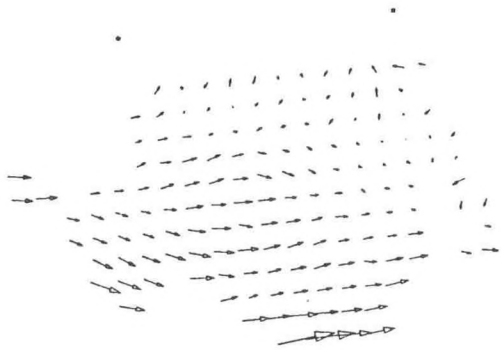
TRUE NORTH



1240 09*OCT*82
1250 09-OCT-82

8.0 KM , 200.0 CM/S

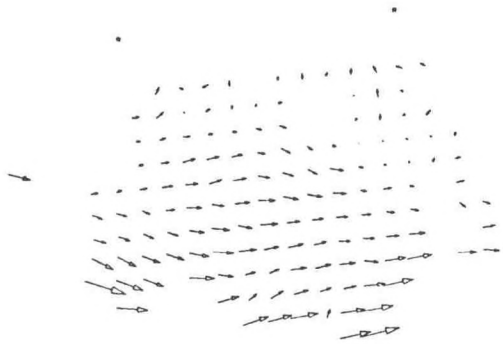
TRUE NORTH



1340 09*OCT*82
1350 09*OCT*82

8.0 KM , 200.0 CM/S

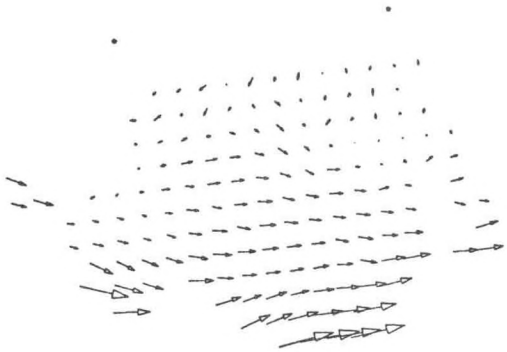
TRUE NORTH



1440 09*OCT*82
1450 09-OCT-82

8.0 KM , 200.0 CM/S

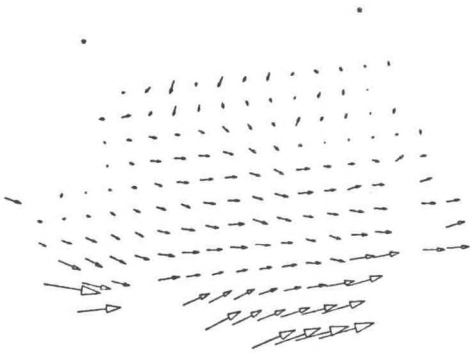
TRUE NORTH



1540 09*OCT*82
1550 09-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1640 09-OCT-82
1650 09-OCT-82

8.0 KM , 200.0 CM/S

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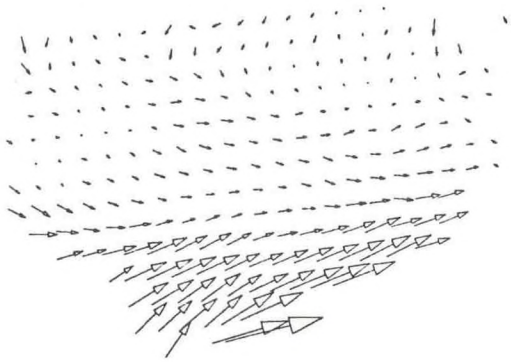

1740 09-OCT-82
1750 09-OCT-82

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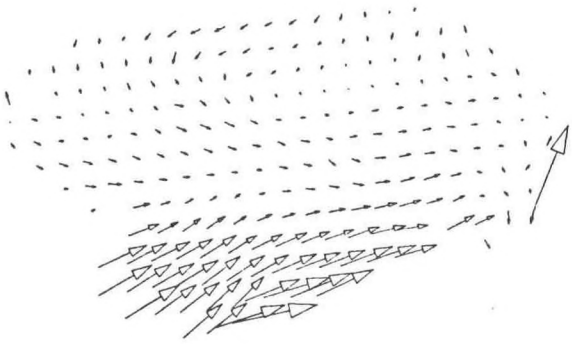

1840 09-OCT-82
1850 09*OCT*82

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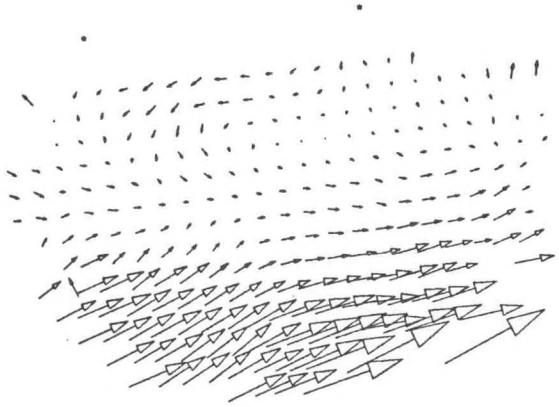

1940 09-OCT-82
1950 09*OCT*82

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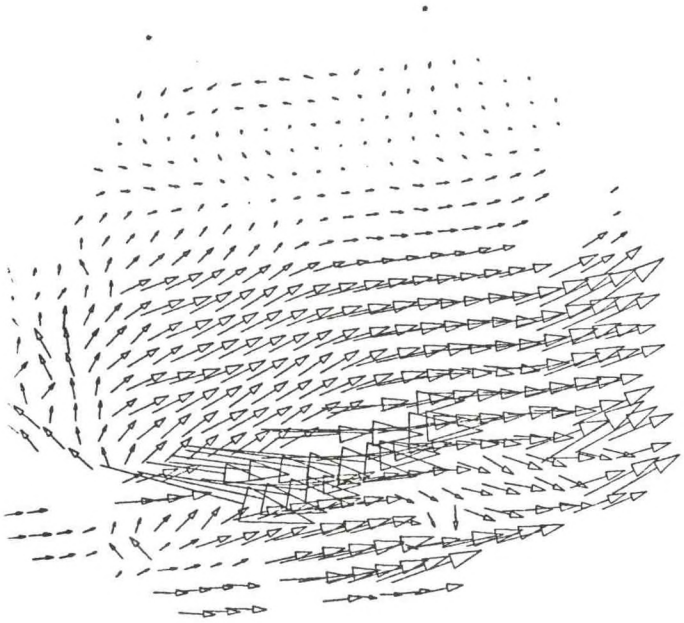

2040 09-OCT-82
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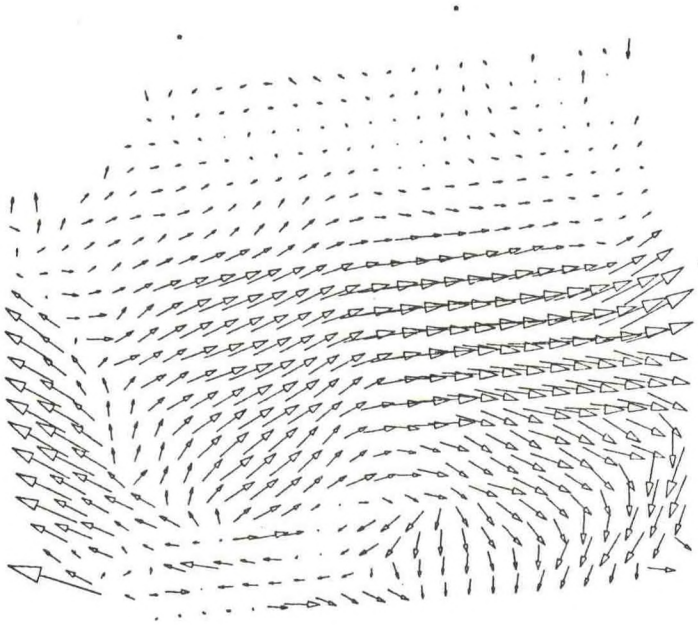

2140 09-OCT-82
2150 09-OCT-82

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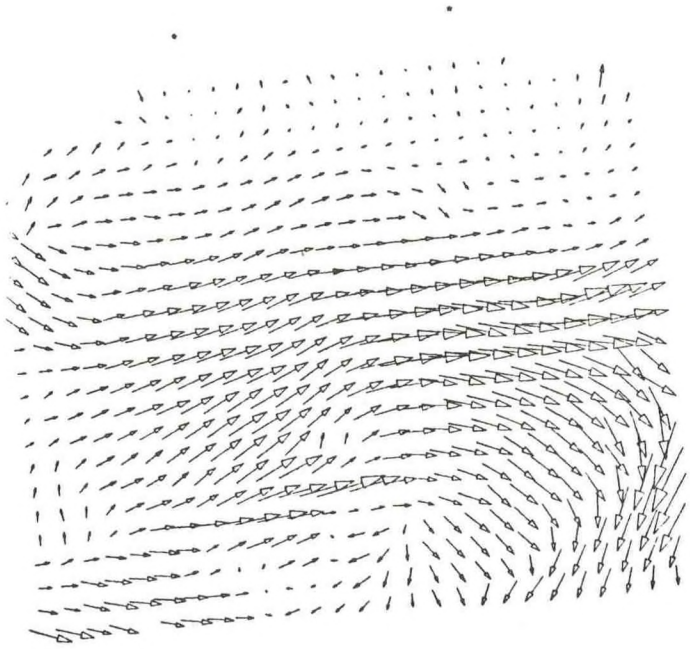

2240 09-OCT-82
2250 09-OCT-82

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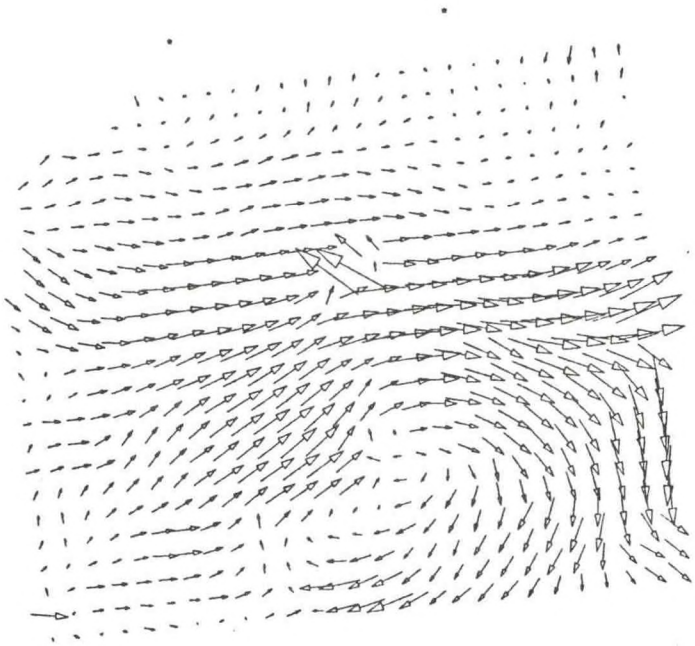
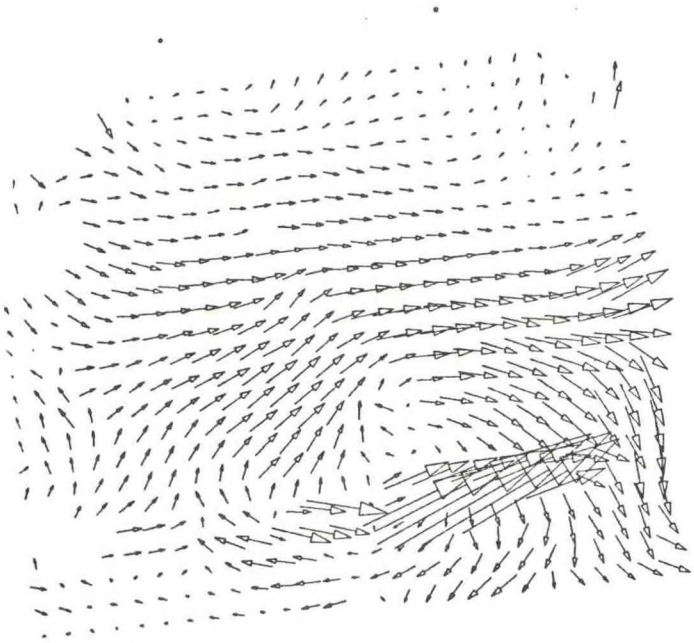
TRUE NORTH ↑



2340 09-OCT-82
2350 09-OCT-82

8.0 KM , 200.0 CM/S

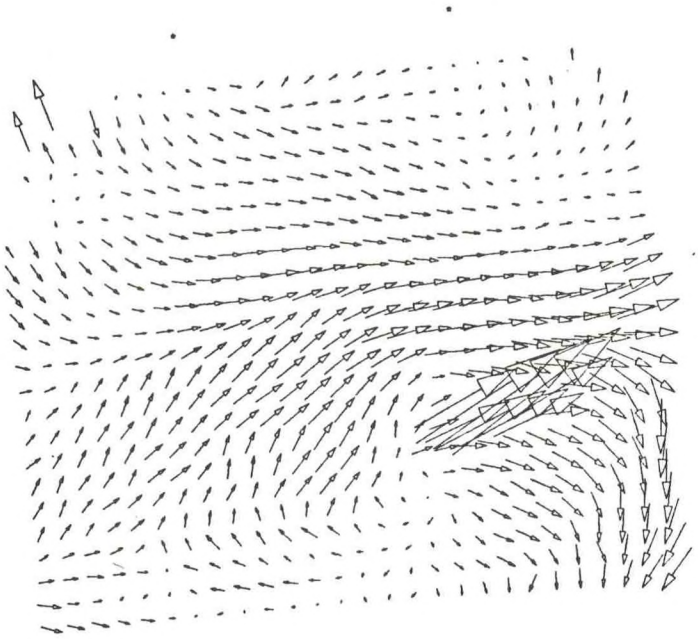
TRUE NORTH ↑



0040 10-OCT-82
0050 10-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



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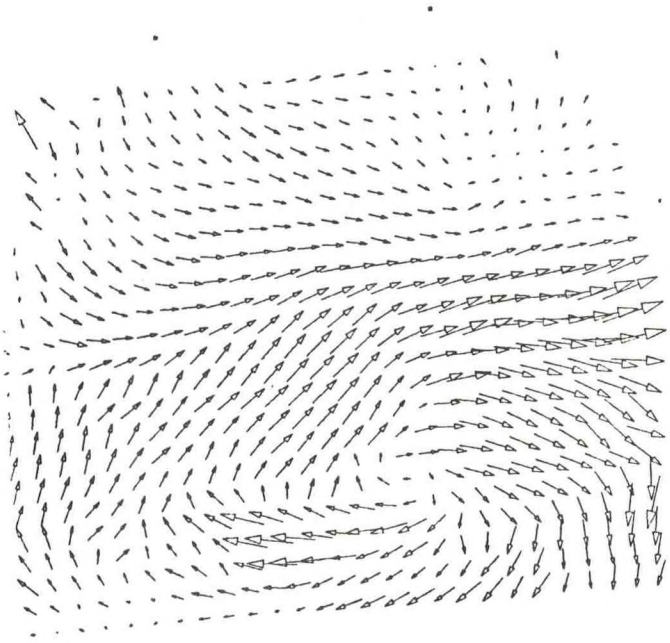

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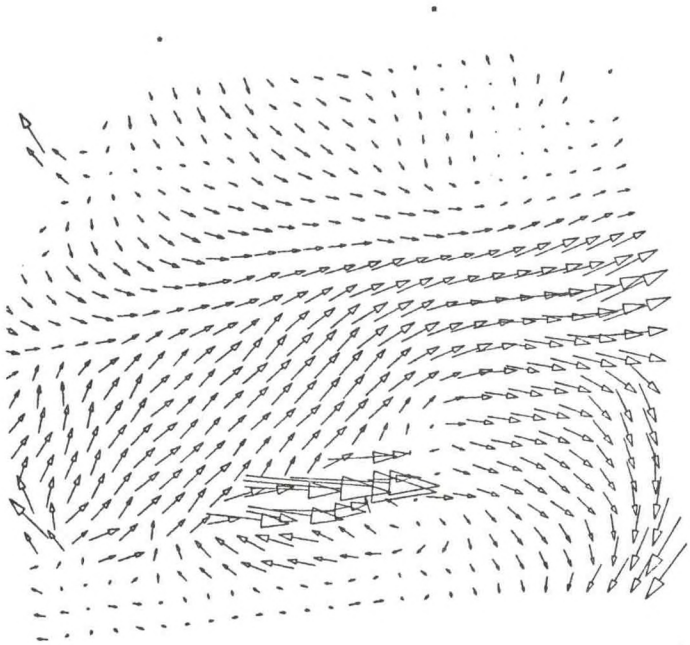

0340 10-OCT-82
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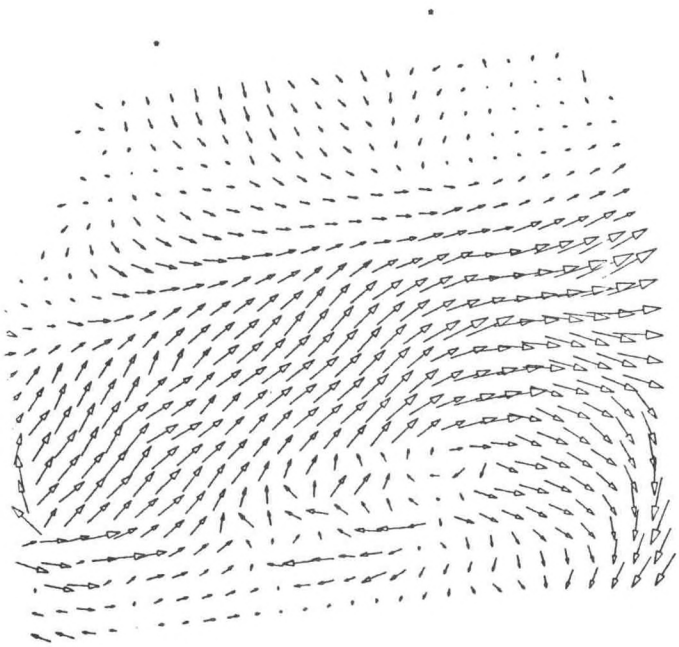
8.0 KM , 200.0 CM/S

TRUE NORTH



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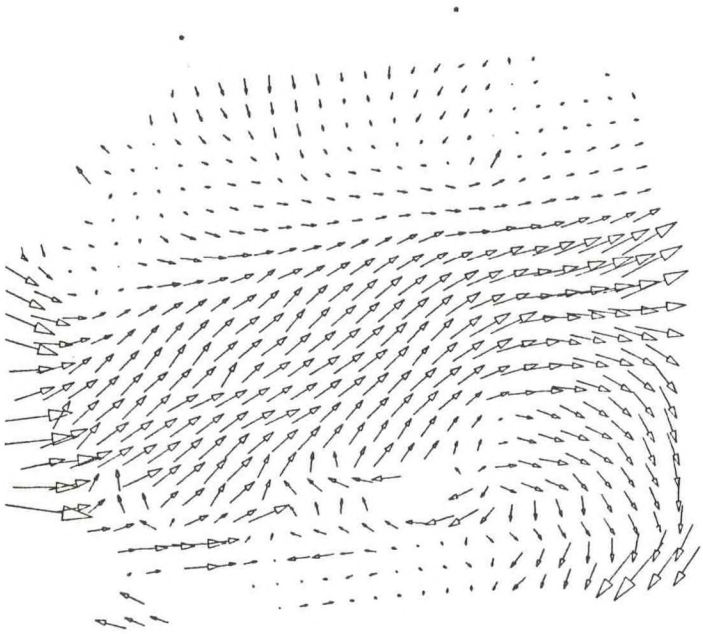

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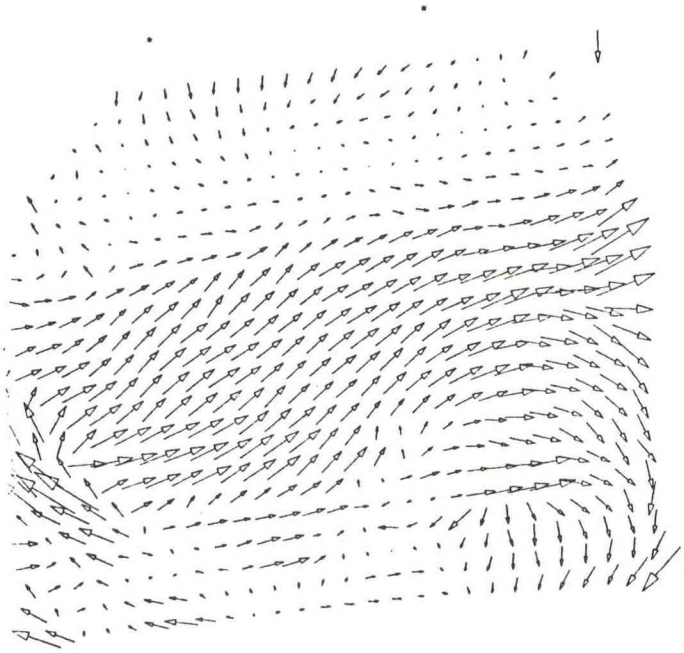

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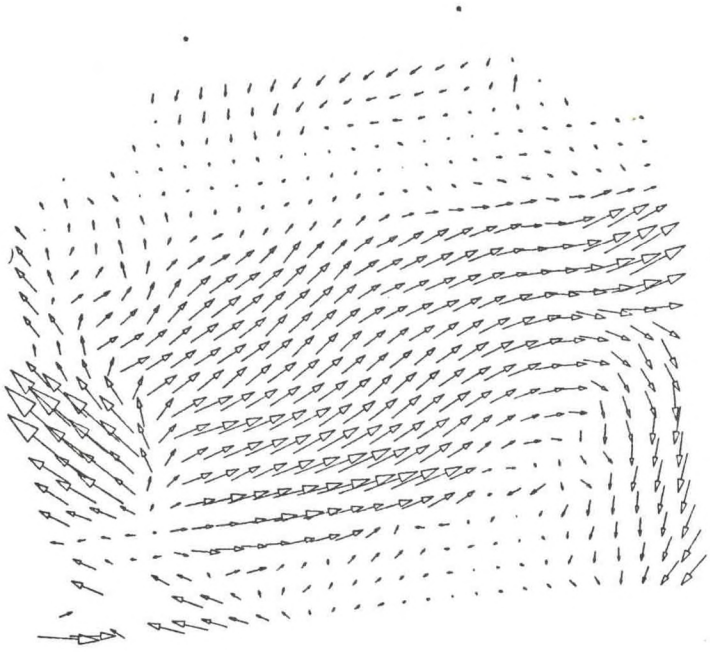

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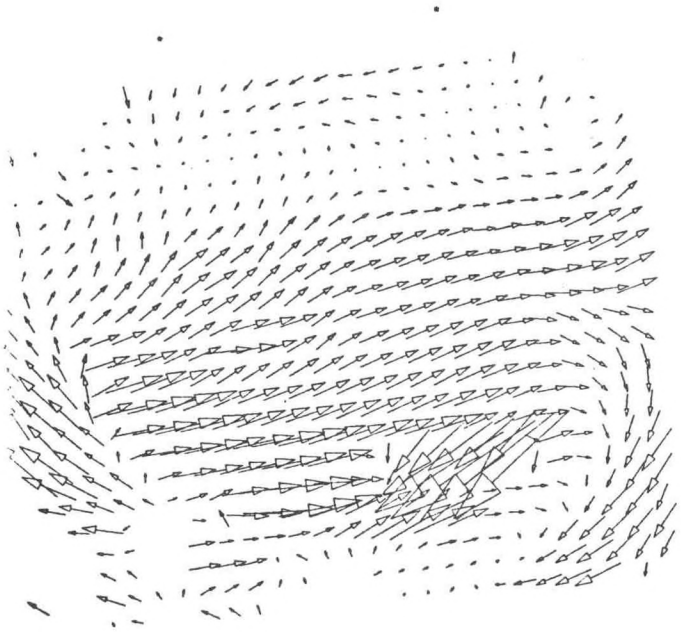
TRUE NORTH



0840 10-OCT-82
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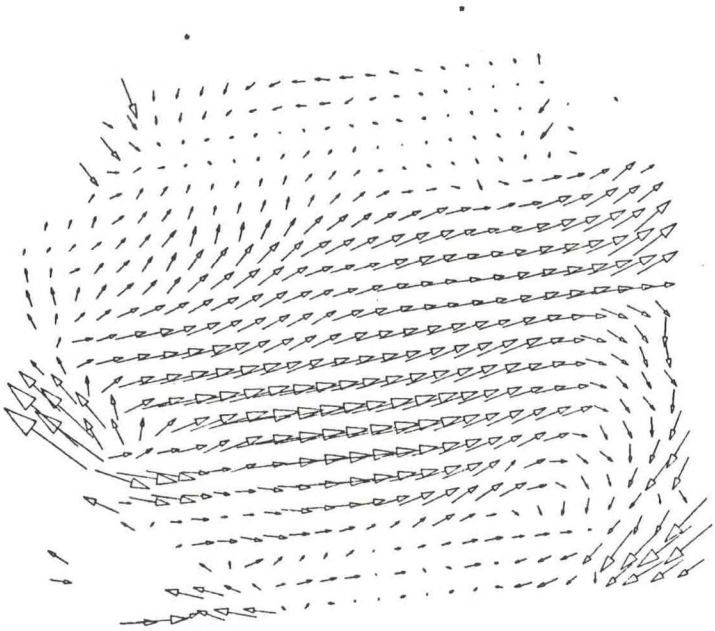
8.0 KM , 200.0 CM/S

TRUE NORTH



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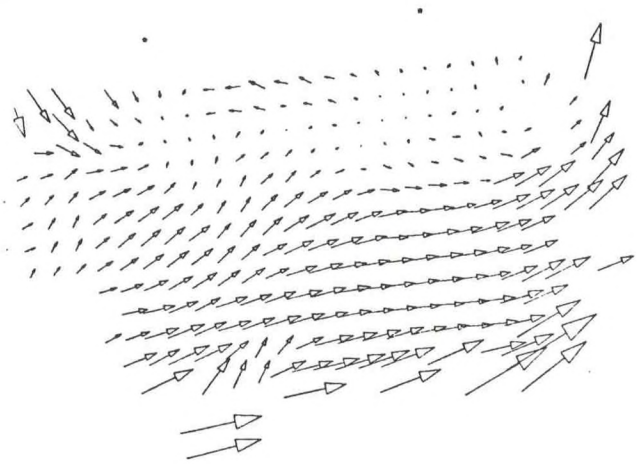
TRUE NORTH



1040 10-OCT-82
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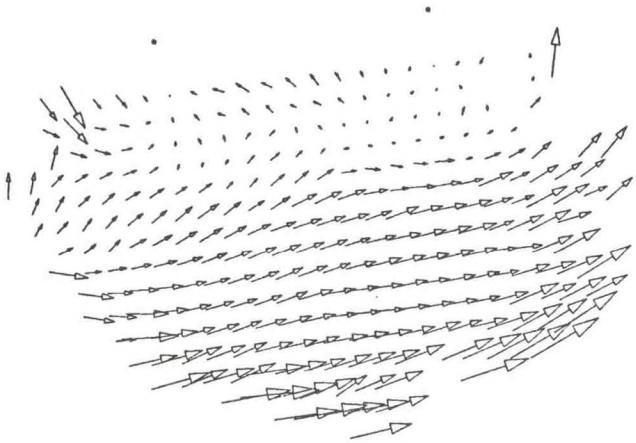
8.0 KM . 200.0 CM/S

TRUE NORTH



1140 10-OCT-82
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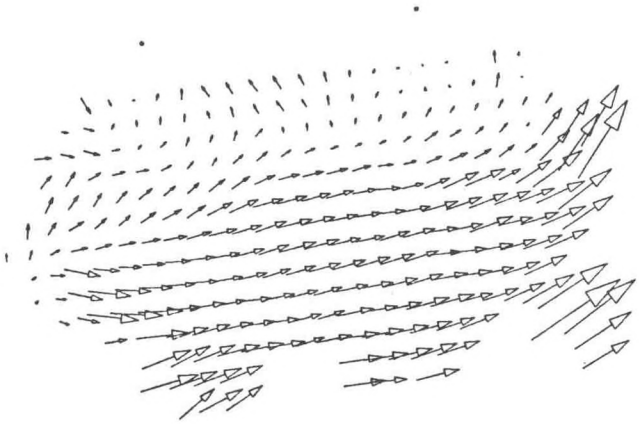
8.0 KM . 200.0 CM/S

TRUE NORTH



1240 10-OCT-82
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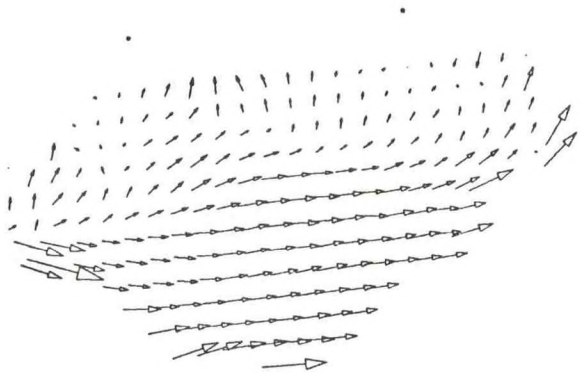
8.0 KM , 200.0 CM/S

TRUE NORTH



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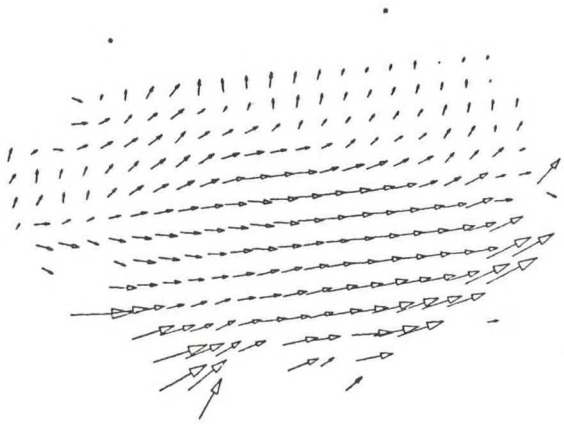
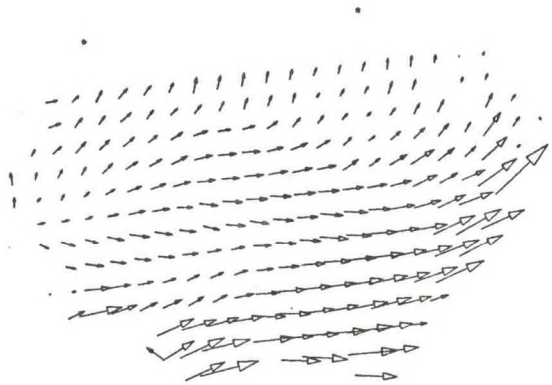


1440 10-OCT-82
1450 10-OCT-82

8.0 KM . 200.0 CM/S

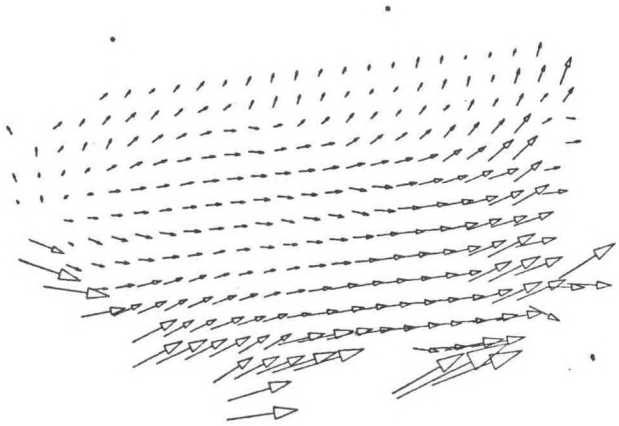
TRUE NORTH



1540 10-OCT-82
1550 10-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



1640 10-OCT-82
1650 10-OCT-82

8.0 KM , 200.0 CM/S

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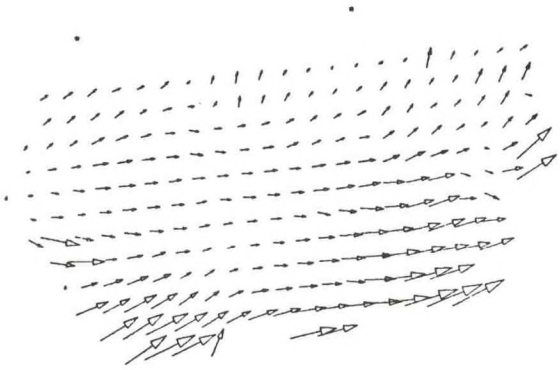

1740 10-OCT-82
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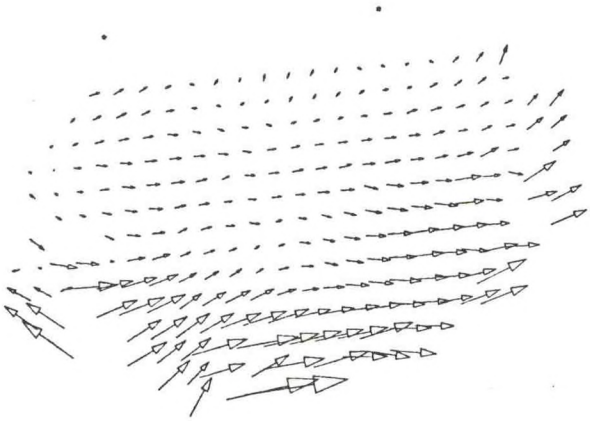

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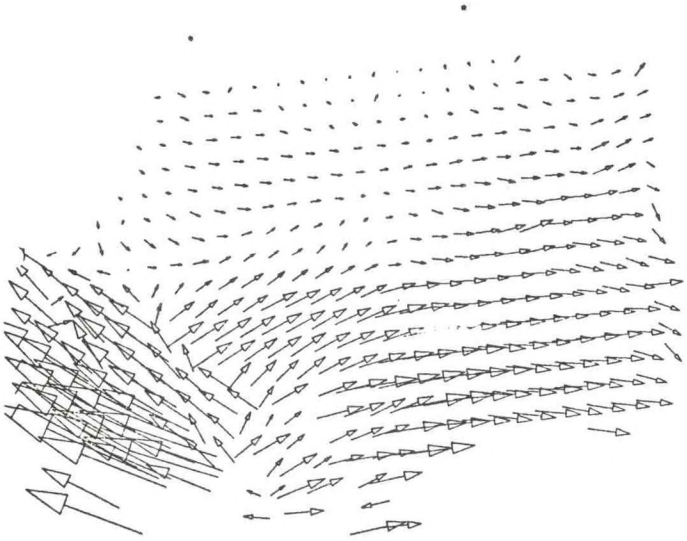
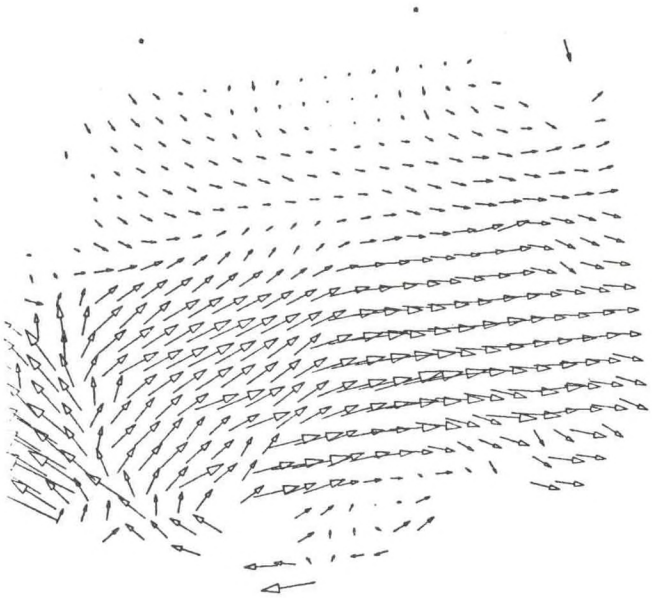


1940 10-OCT-82
1950 10-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



2040 10-OCT-82
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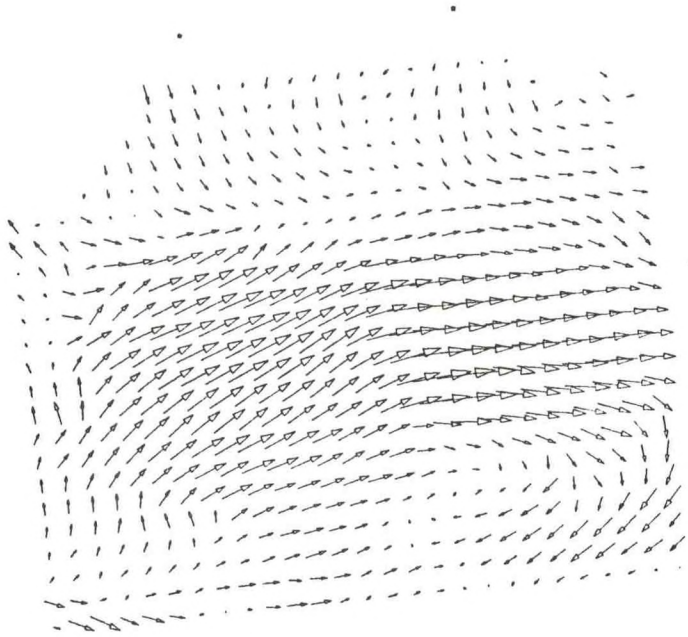
8.0 KM , 200.0 CM/S

TRUE NORTH



2140 10-OCT-82
2150 10-OCT-82

8.0 KM , 200.0 CM/S

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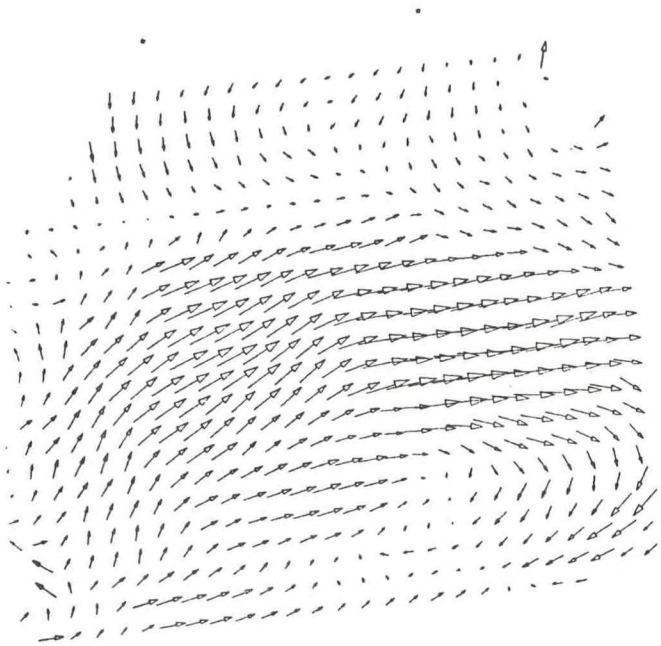

2240 10-OCT-82
2250 10-OCT-82

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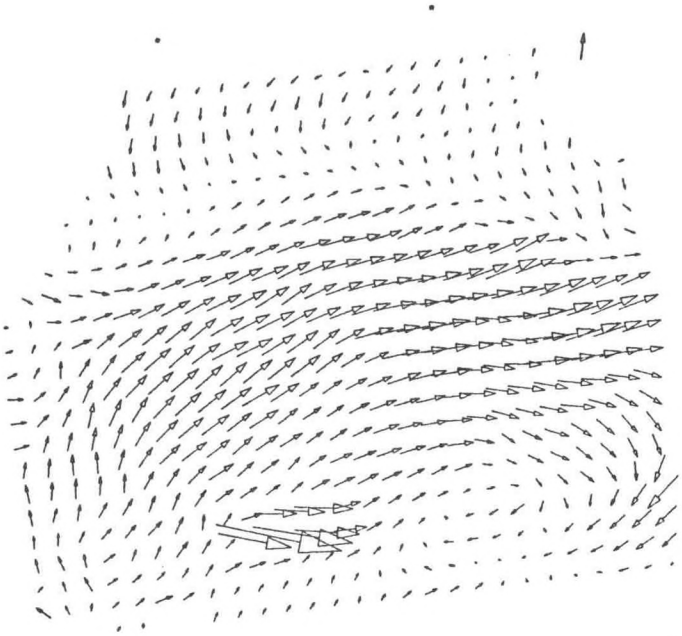
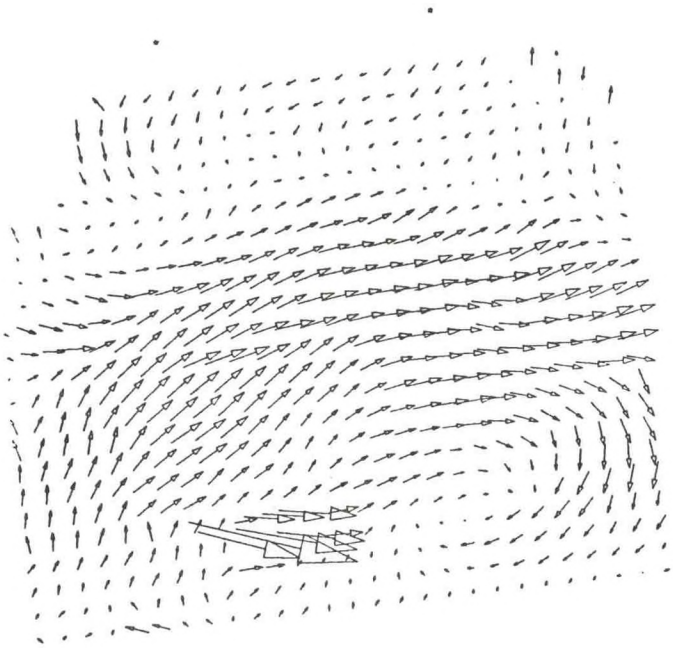
TRUE NORTH



2340 10-OCT-82
2350 10-OCT-82

8.0 KM , 200.0 CM/S

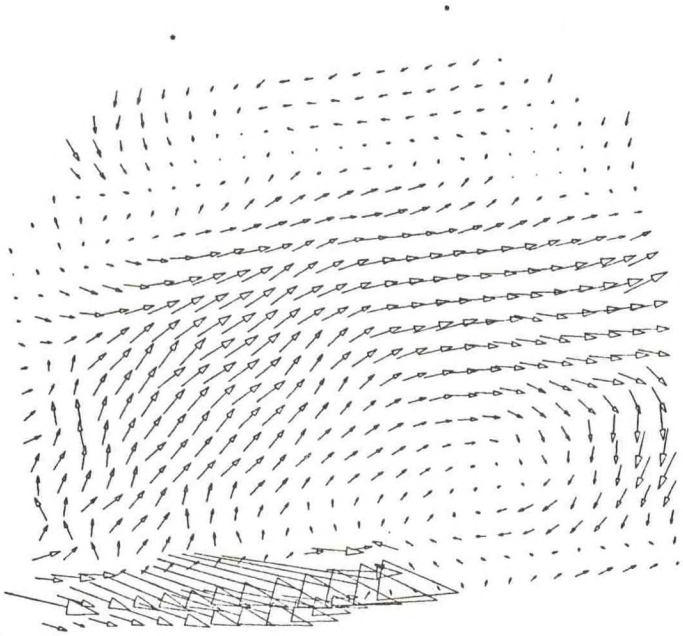
TRUE NORTH



0040 11-OCT-82
0050 11-OCT-82

8.0 KM , 200.0 CM/S

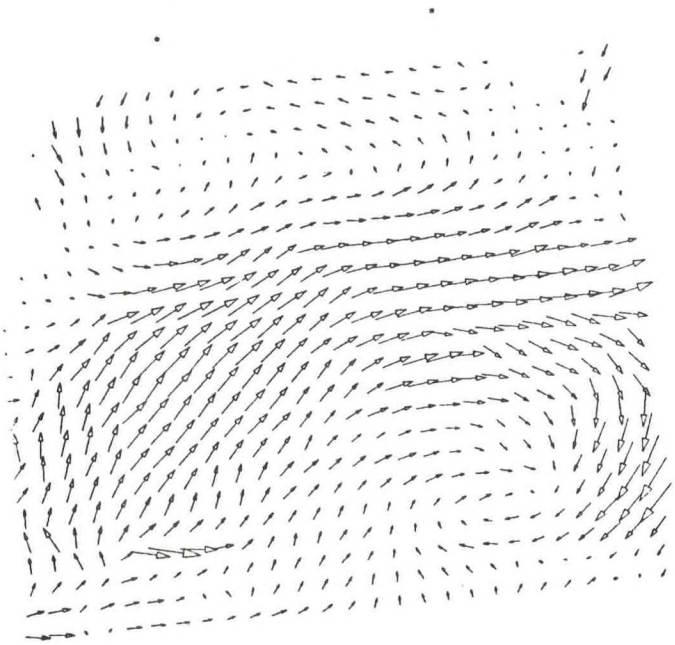
TRUE NORTH ↑



0140 11-OCT-82
0150 11-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑



0240 11-OCT-82
0250 11-OCT-82

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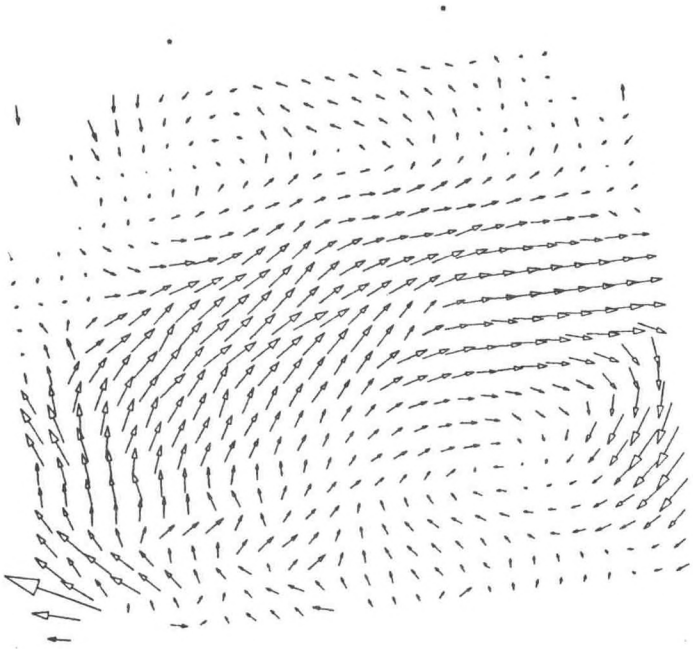

0340 11-OCT-82
0350 11-OCT-82

8.0 KM , 200.0 CM/S

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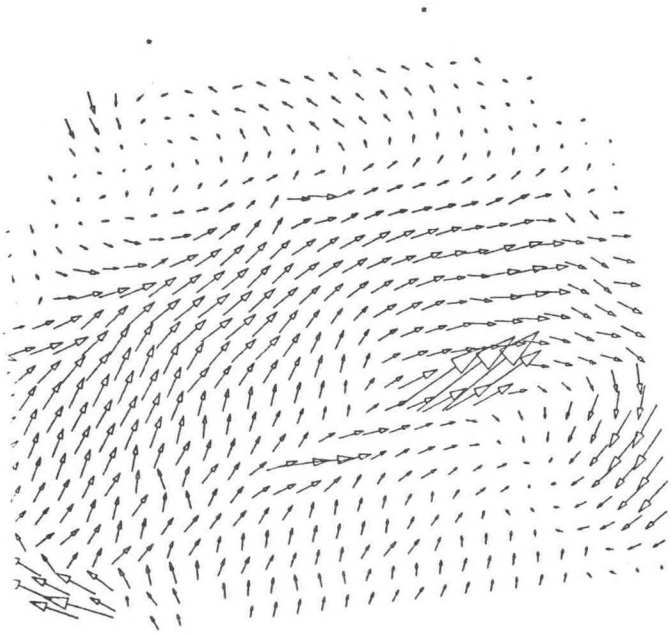

0440 11-OCT-82
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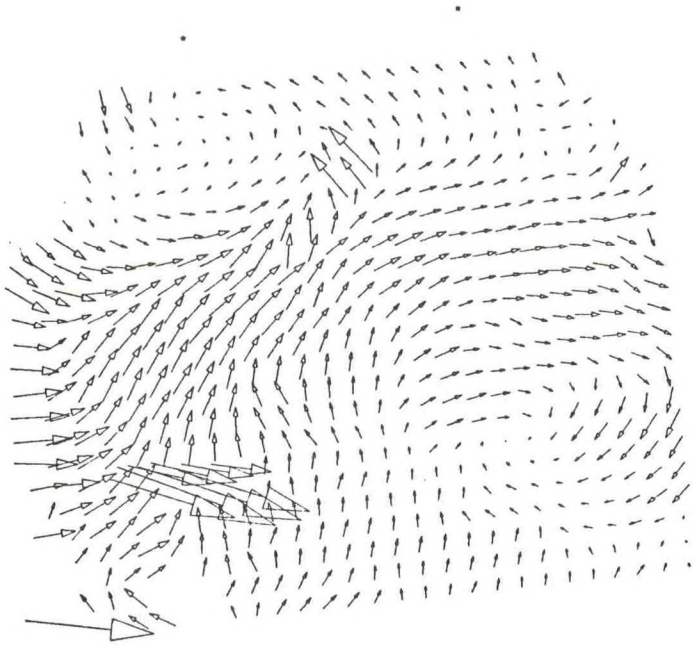
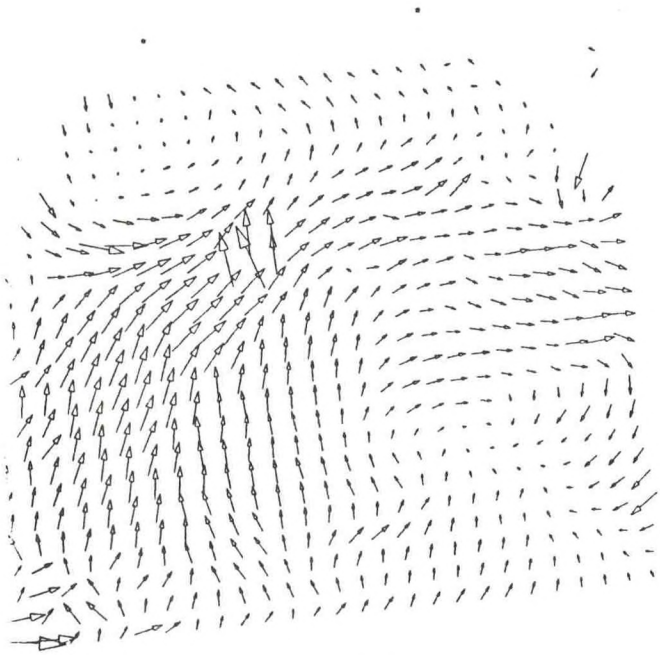
TRUE NORTH



0540 11-OCT-82
0550 11-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0640 11-OCT-82
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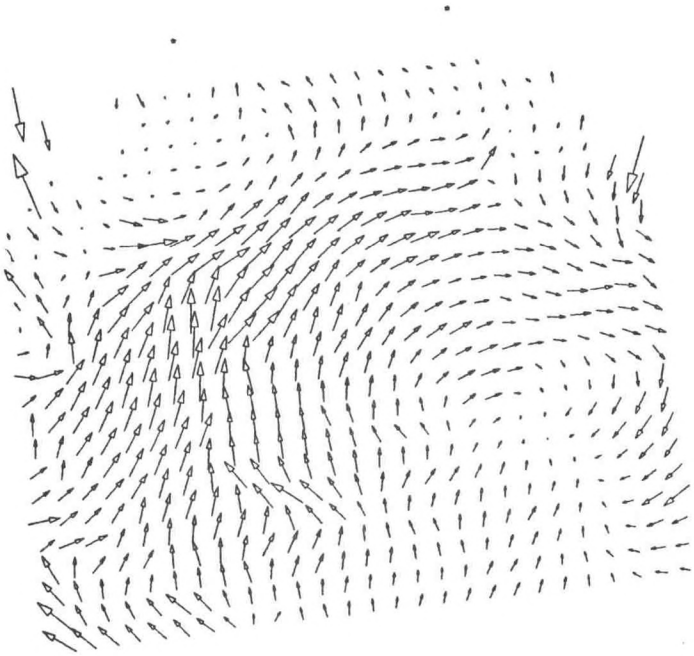
8.0 KM . 200.0 CM/S

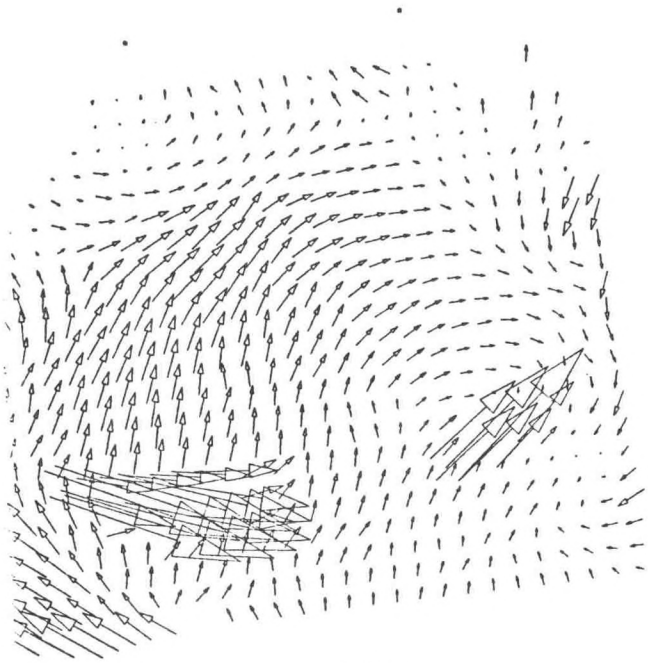
TRUE NORTH



0740 11-OCT-82
0750 11-OCT-82

8.0 KM . 200.0 CM/S

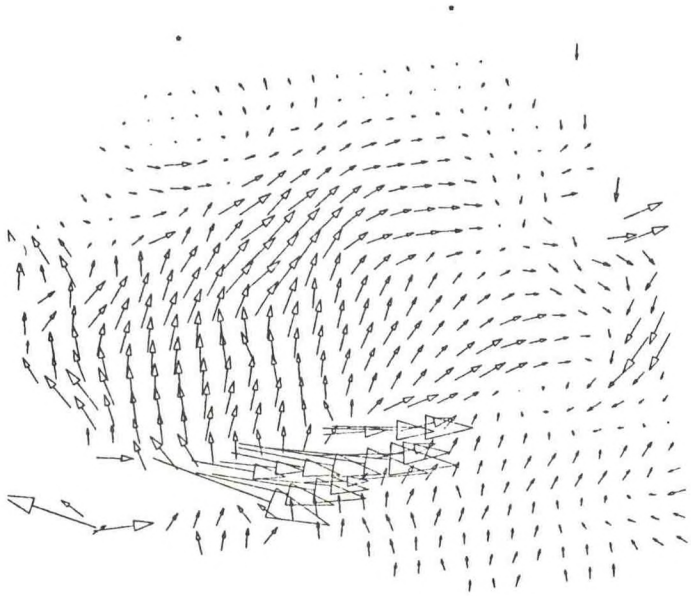
TRUE NORTH



0840 11-OCT-82
0850 11-OCT-82

8.0 KM . 200.0 CM/S

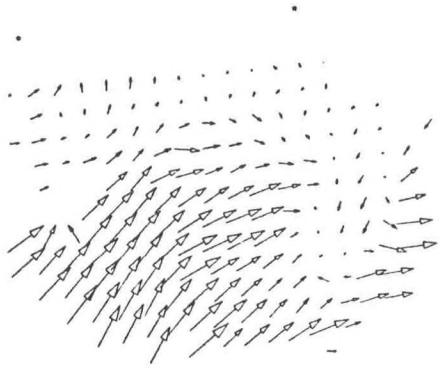
TRUE NORTH



0940 11-OCT-82
0950 11-OCT-82

8.0 KM . 200.0 CM/S

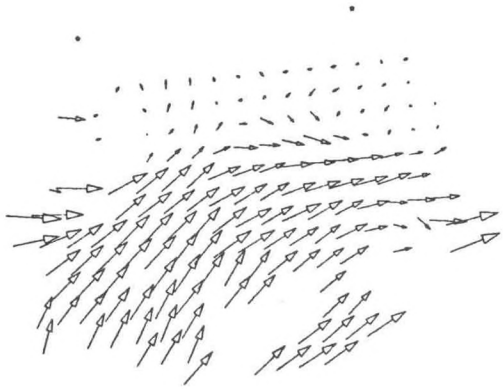
TRUE NORTH



1040 11-OCT-82
1050 11*OCT*82

8.0 KM . 200.0 CM/S

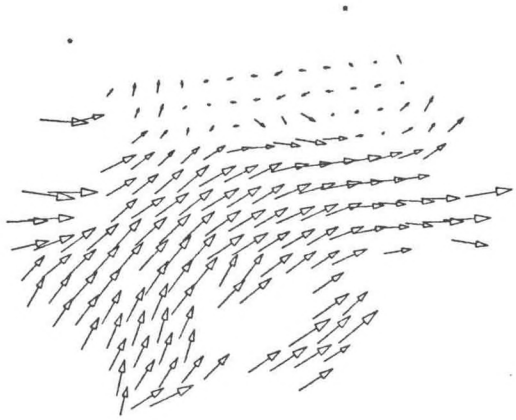
TRUE NORTH



1140 11-OCT-82
1150 11*OCT*82

8.0 KM . 200.0 CM/S

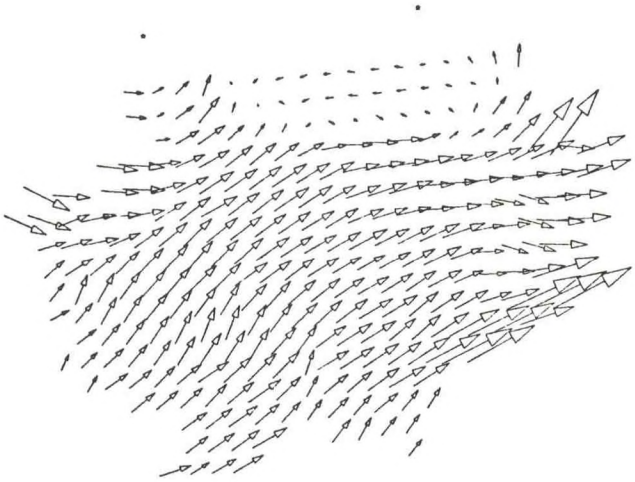
TRUE NORTH



1240 11-OCT-82
1250 11-OCT-82

8.0 KM . 200.0 CM/S

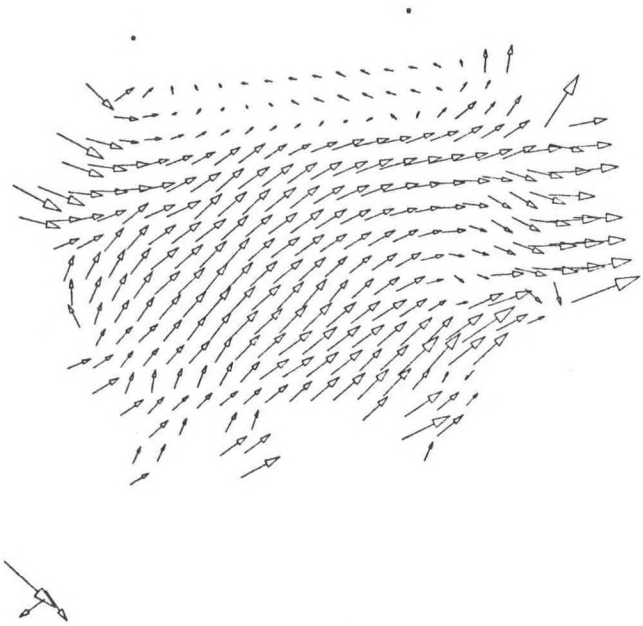
TRUE NORTH



1340 11-OCT-82
1350 11-OCT-82

8.0 KM . 200.0 CM/S

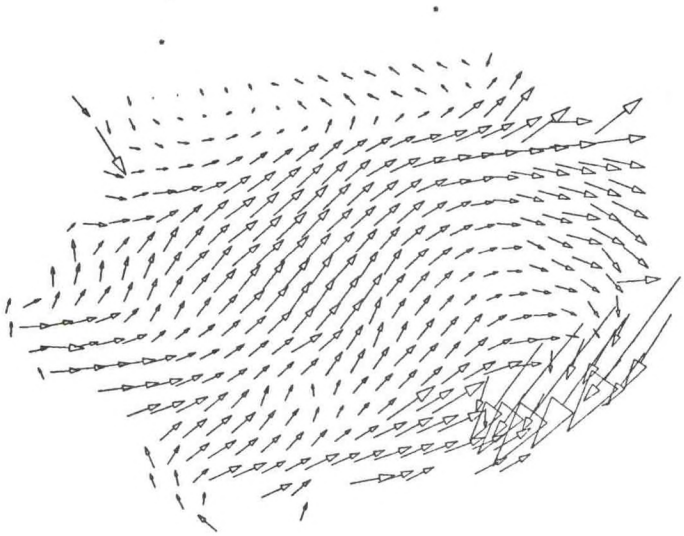
TRUE NORTH



1440 11-OCT-82
1450 11-OCT-82

8.0 KM , 200.0 CM/S

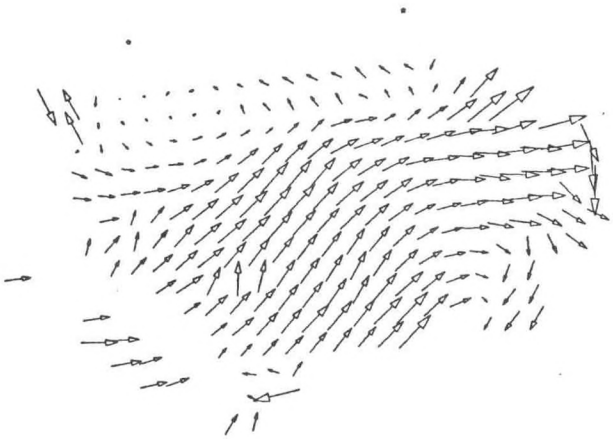
TRUE NORTH



1540 11-OCT-82
1550 11-OCT-82

8.0 KM , 200.0 CM/S

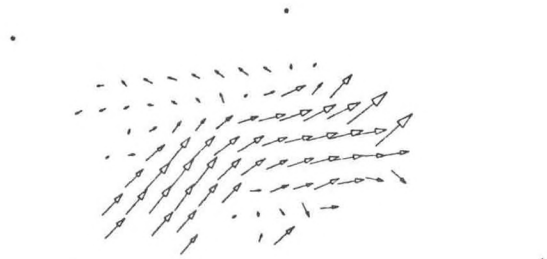
TRUE NORTH



1640 11-OCT-82
1650 11-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1740 11-OCT-82
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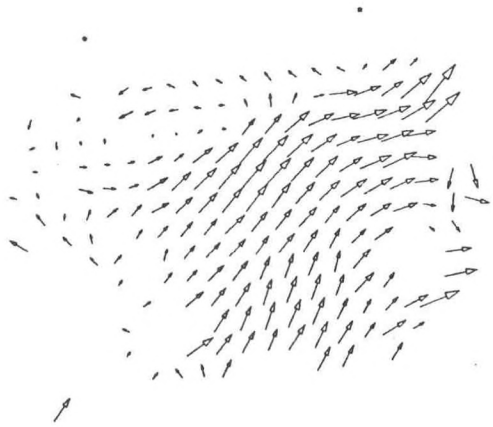
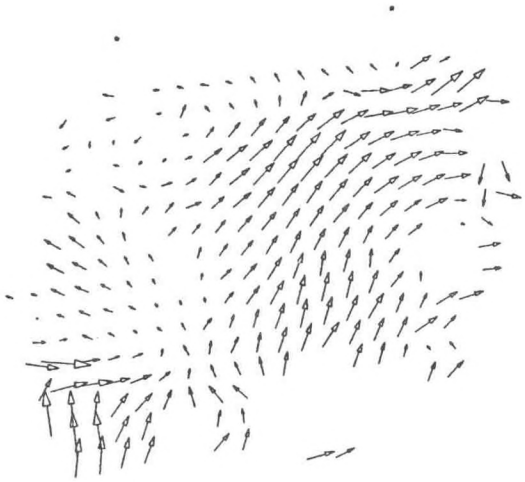
TRUE NORTH



1840 11-OCT-82
1850 11-OCT-82

8.0 KM . 200.0 CM/S

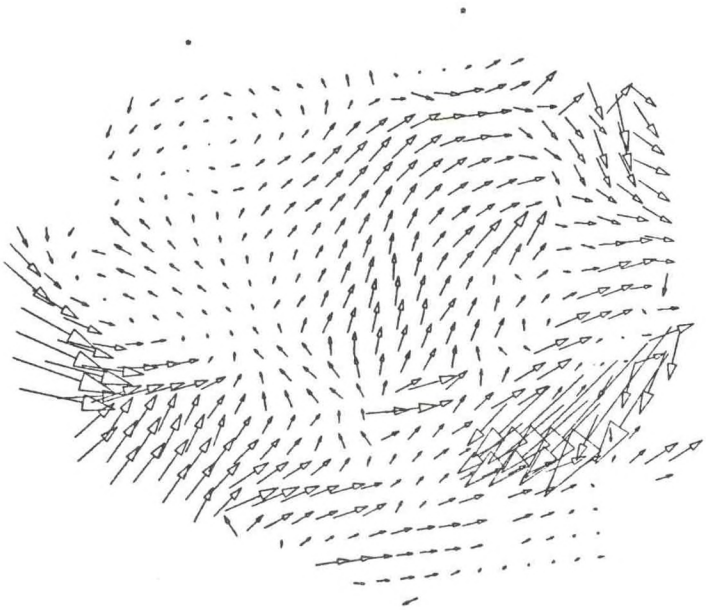
TRUE NORTH



1940 11-OCT-82
1950 11-OCT-82

8.0 KM . 200.0 CM/S

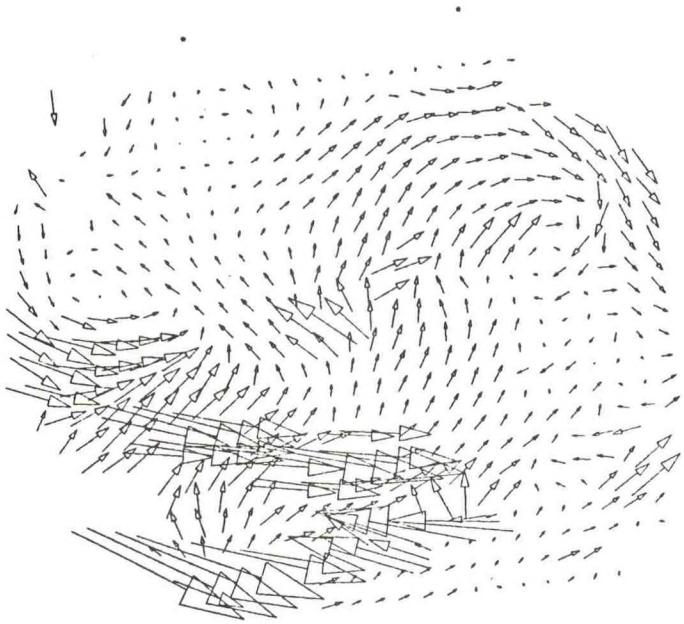
TRUE NORTH



2040 11-OCT-82
2050 11-OCT-82

8.0 KM , 200.0 CM/S

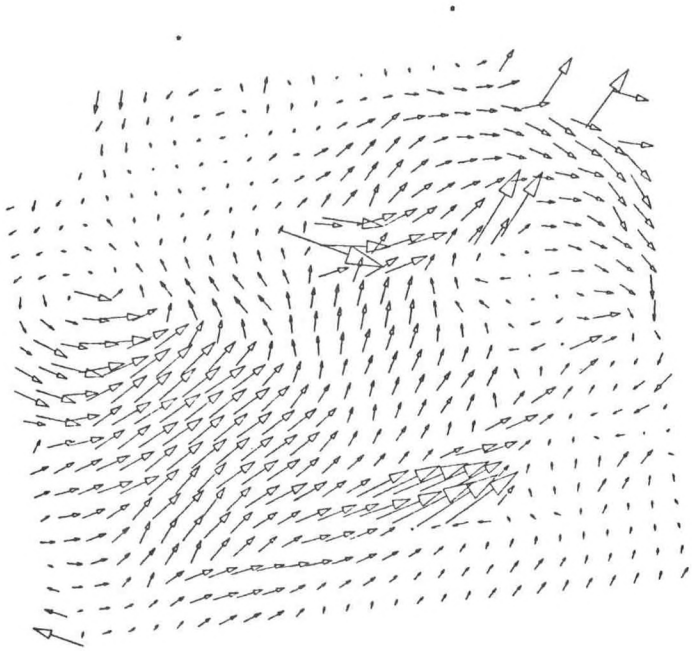
TRUE NORTH



2140 11-OCT-82
2150 11-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



2240 11-OCT-82
2250 11-OCT-82

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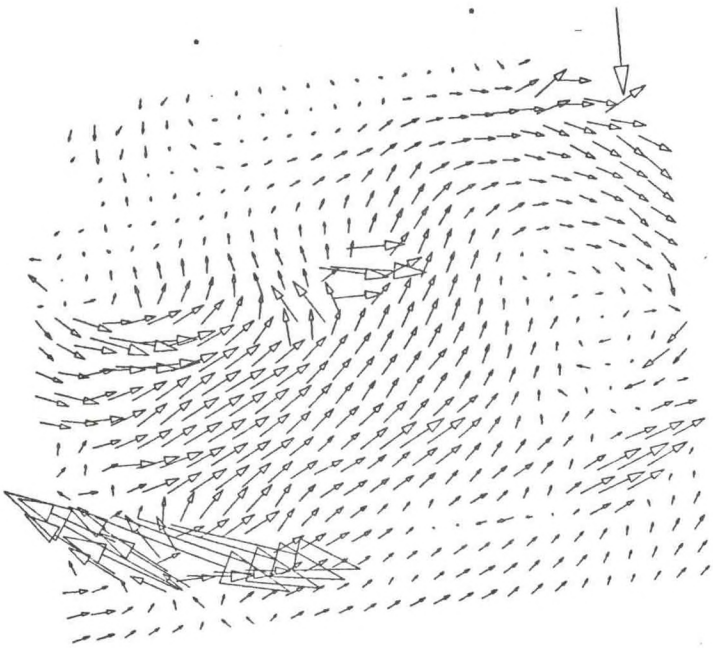
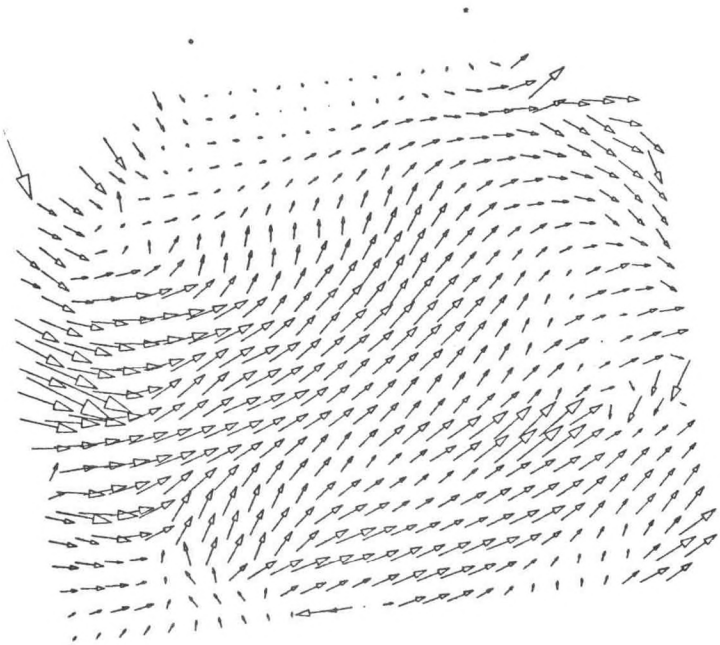


2340 11-OCT-82
2350 11-OCT-82

8.0 KM , 200.0 CM/S

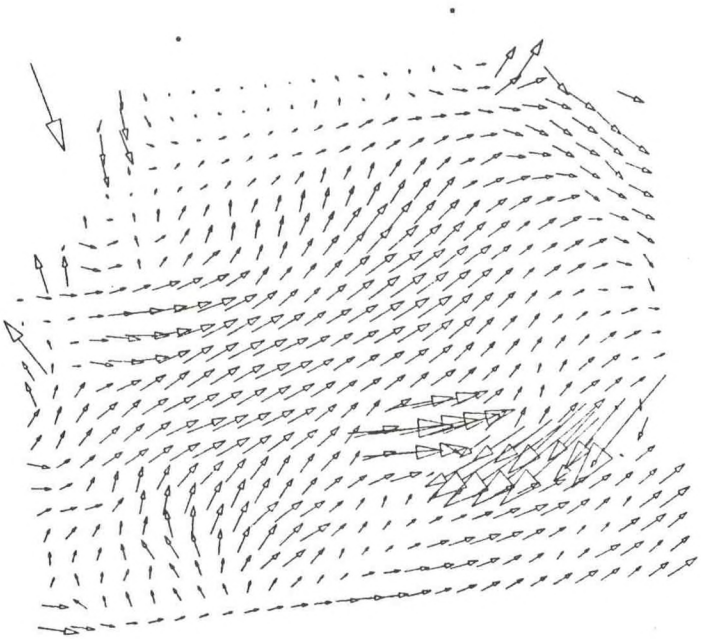
TRUE NORTH



0040 12-OCT-82
0050 12-OCT-82

8.0 KM , 200.0 CM/S

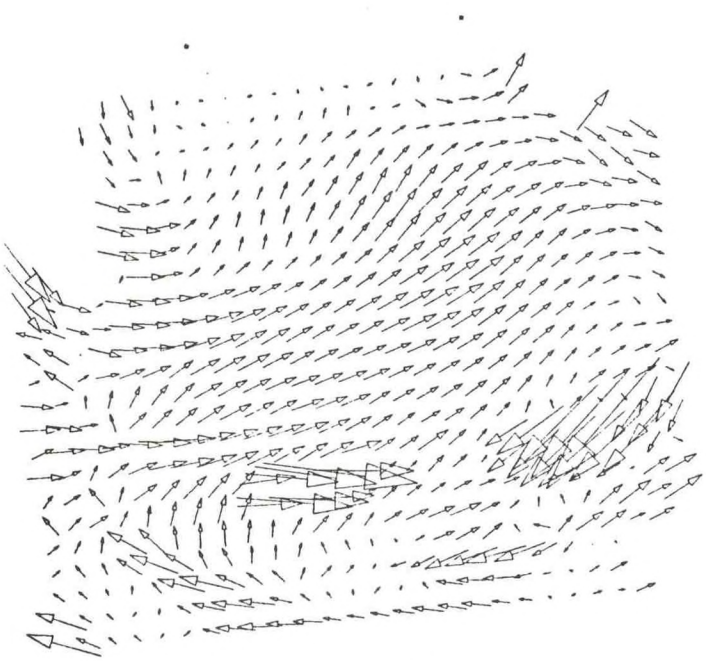
TRUE NORTH



0140 12-OCT-82
0150 12-OCT-82

8.0 KM , 200.0 CM/S

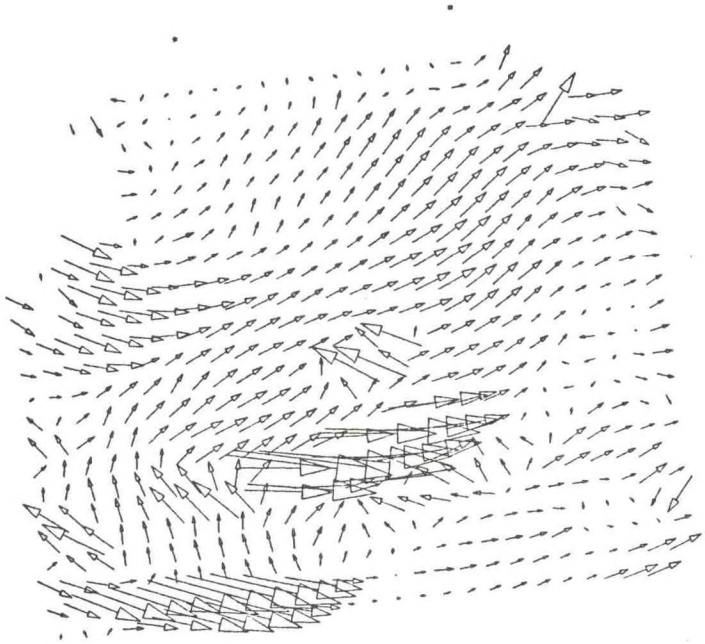
TRUE NORTH



0240 12-OCT-82
0250 12-OCT-82

8.0 KM , 200.0 CM/S

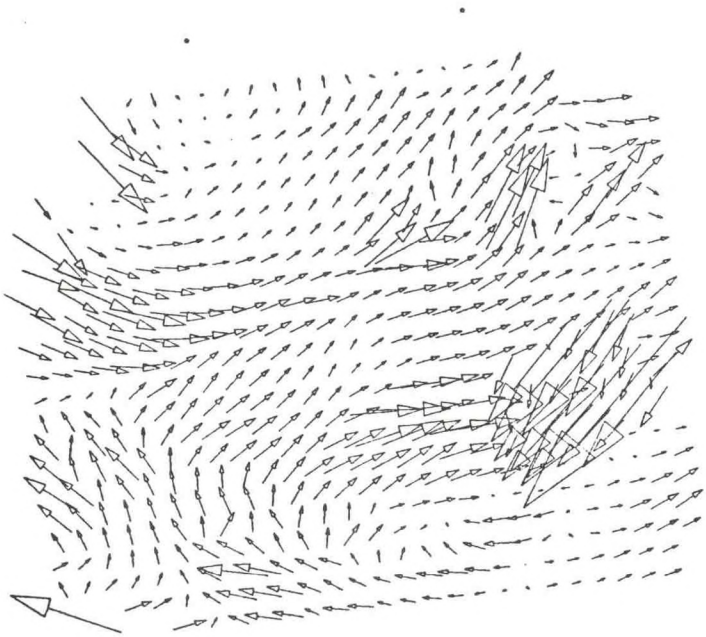
TRUE NORTH ↑



0340 12-OCT-82
0350 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑



0440 12-OCT-82
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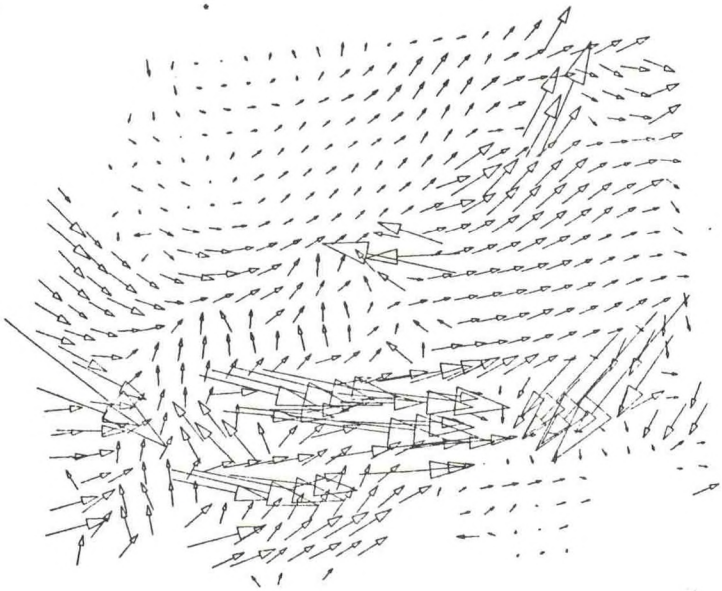
8.0 KM , 200.0 CM/S

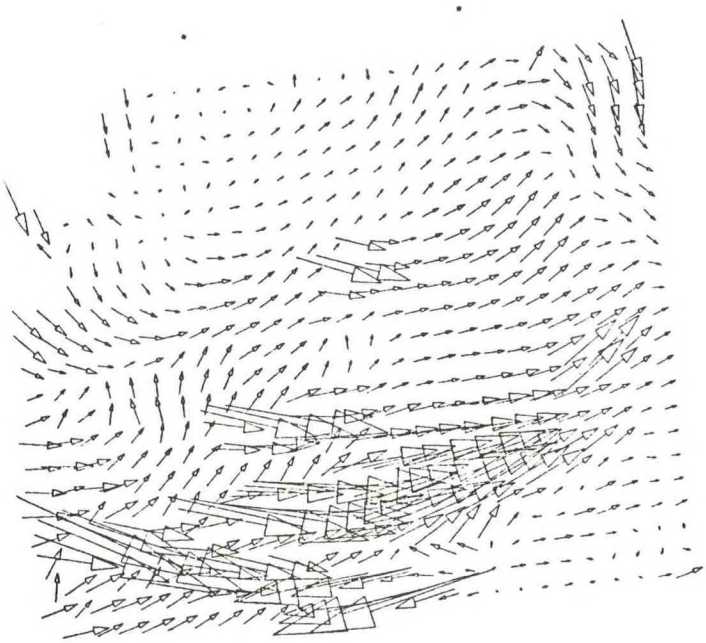
TRUE NORTH



0540 12-OCT-82
0550 12-OCT-82

8.0 KM , 200.0 CM/S

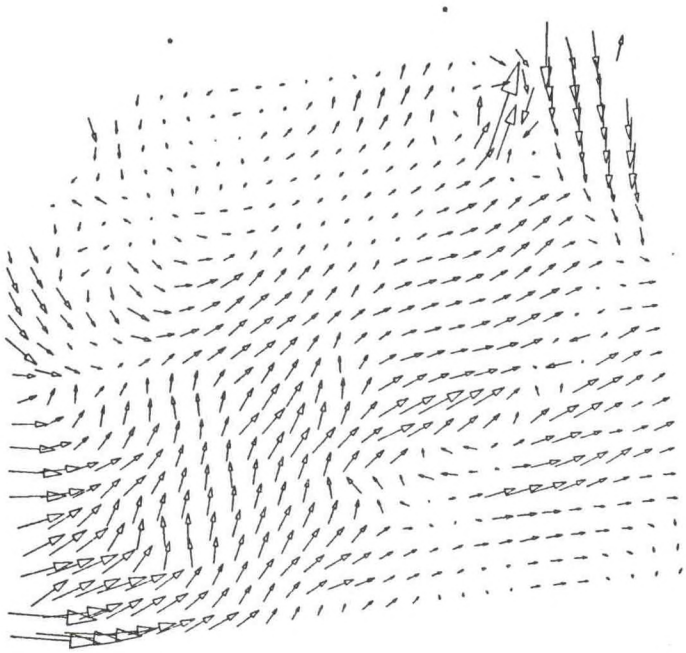
TRUE NORTH



0640 12-OCT-82
0650 12-OCT-82

8.0 KM . 200.0 CM/S

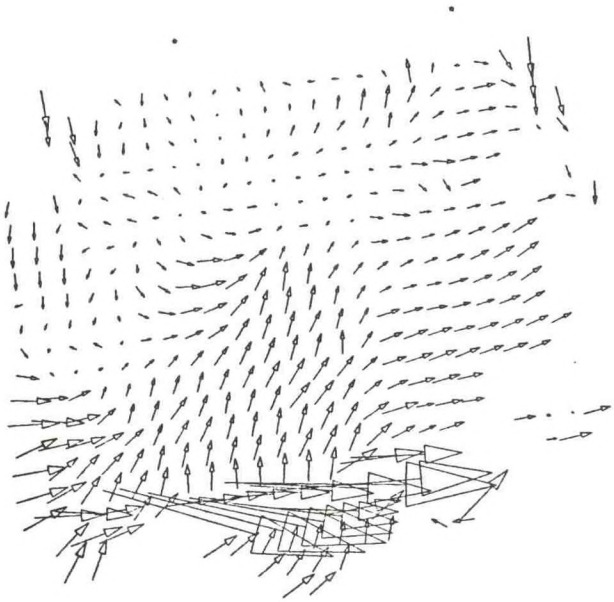
TRUE NORTH



0740 12-OCT-82
0750 12-OCT-82

8.0 KM . 200.0 CM/S

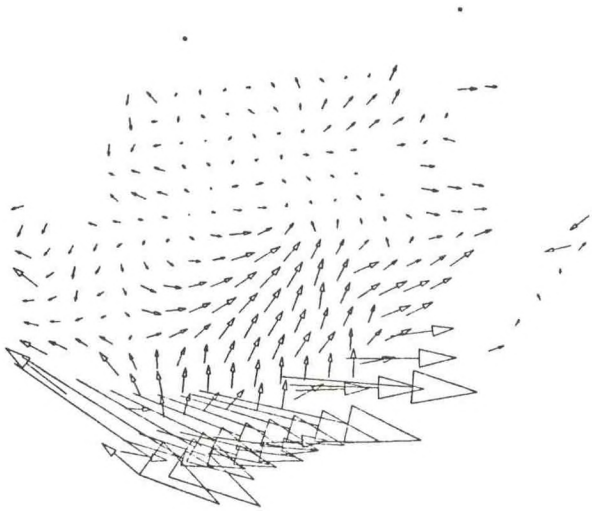
TRUE NORTH



0840 12-OCT-82
0850 12-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0940 12-OCT-82
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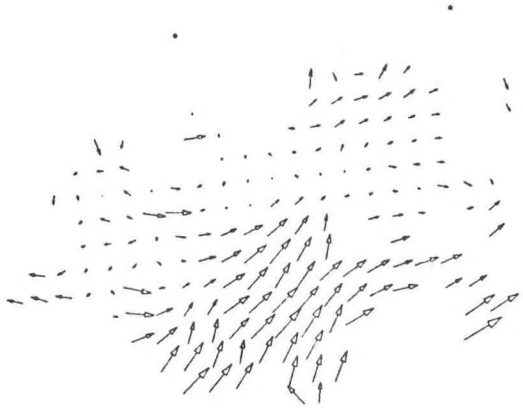
8.0 KM , 200.0 CM/S

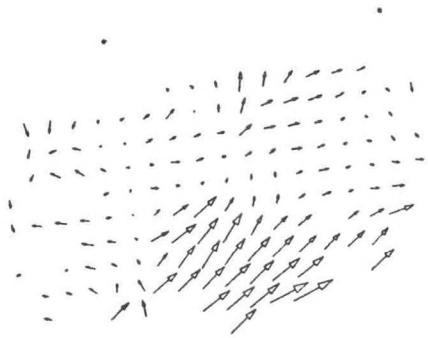
TRUE NORTH



1040 12-OCT-82
1050 12-OCT-82

8.0 KM , 200.0 CM/S

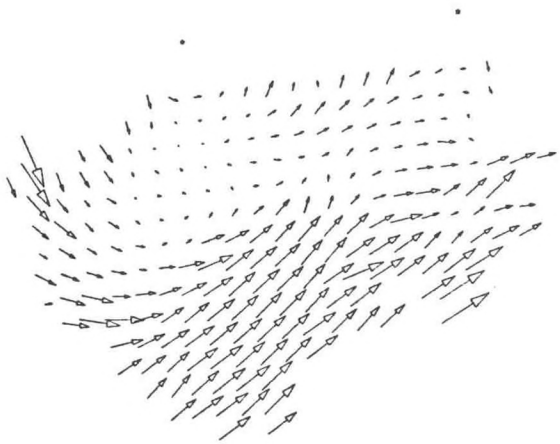
TRUE NORTH



1140 12-OCT-82
1150 12-OCT-82

8.0 KM , 200.0 CM/S

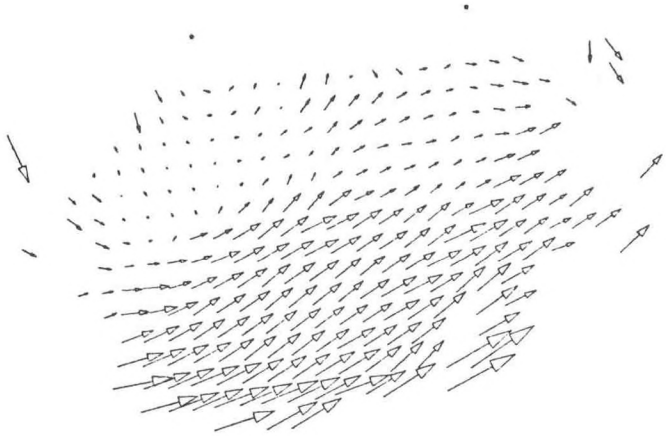
TRUE NORTH



1240 12-OCT-82
1250 12-OCT-82

8.0 KM , 200.0 CM/S

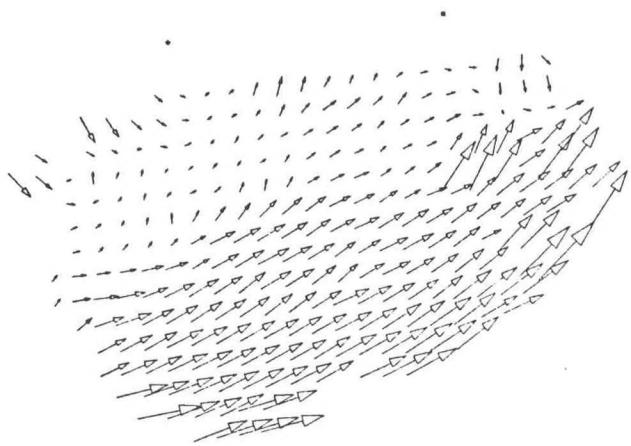
TRUE NORTH



1340 12-OCT-82
1350 12-OCT-82

8.0 KM , 200.0 CM/S

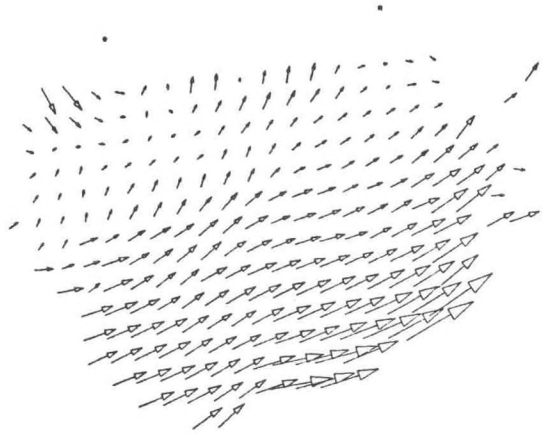
TRUE NORTH



1440 12-OCT-82
1450 12-OCT-82

8.0 KM . 200.0 CM/S

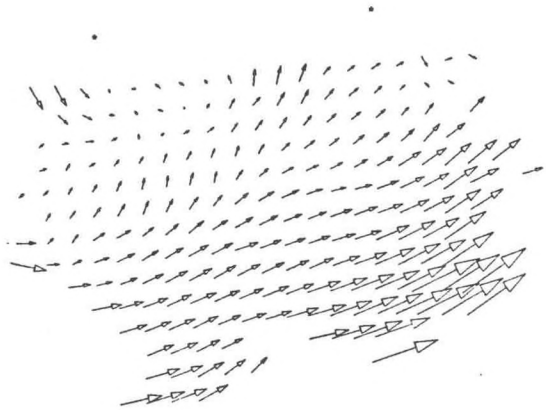
TRUE NORTH



1540 12-OCT-82
1550 12-OCT-82

8.0 KM . 200.0 CM/S

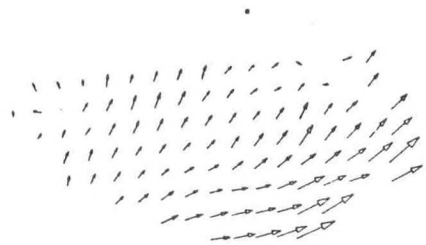
TRUE NORTH



1640 12-OCT-82
1650 12-OCT-82

8.0 KM , 200.0 CM/S

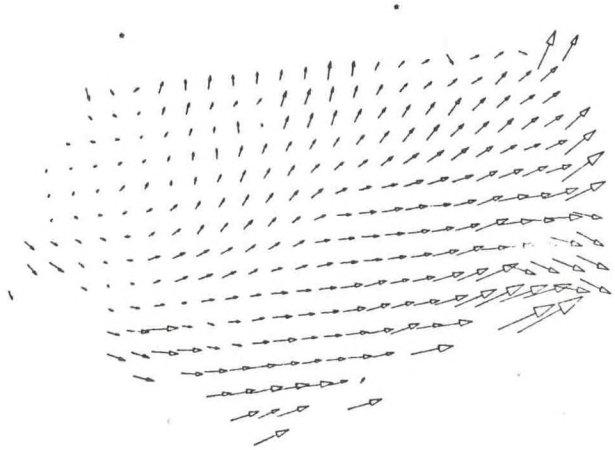
TRUE NORTH



1740 12-OCT-82
1750 12-OCT-82

8.0 KM , 200.0 CM/S

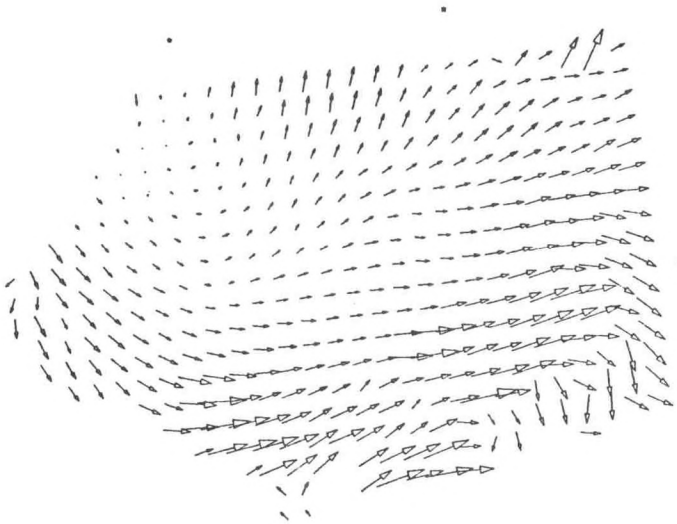
TRUE NORTH



1840 12-OCT-82
1850 12-OCT-82

8.0 KM , 200.0 CM/S

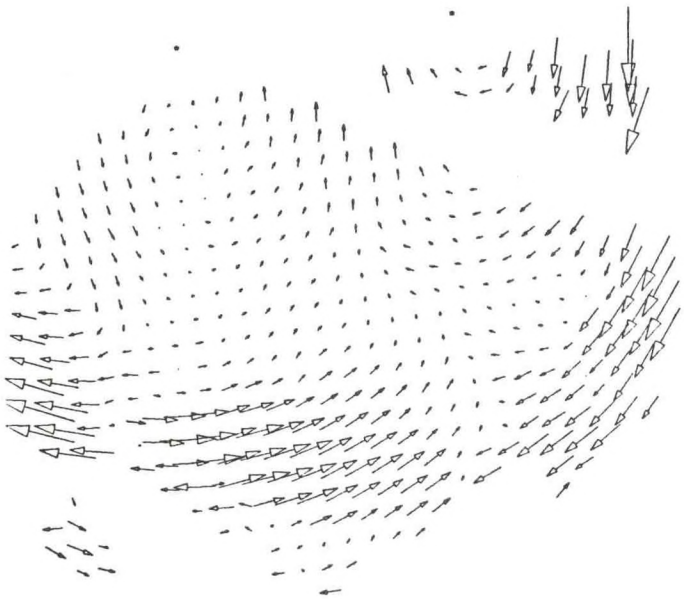
TRUE NORTH



1940 12-OCT-82
1950 12*OCT*82

8.0 KM , 200.0 CM/S

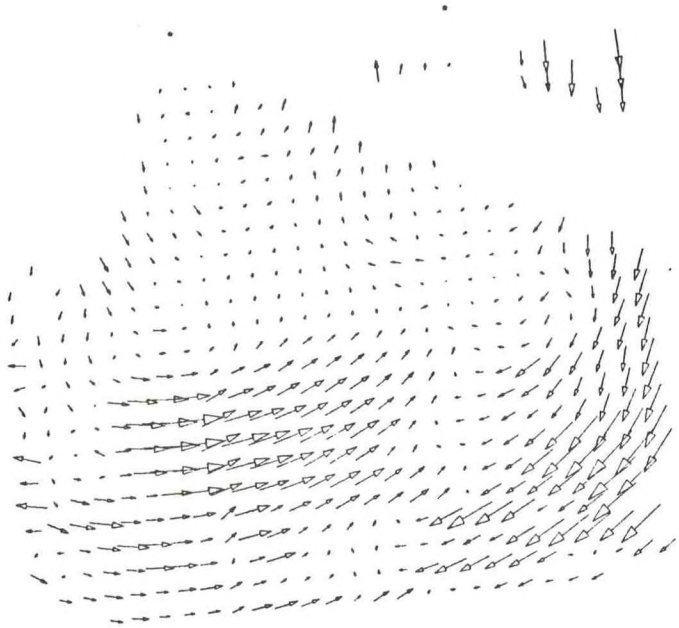
TRUE NORTH



2040 12-OCT-82
2050 12*OCT*82

8.0 KM . 200.0 CM/S

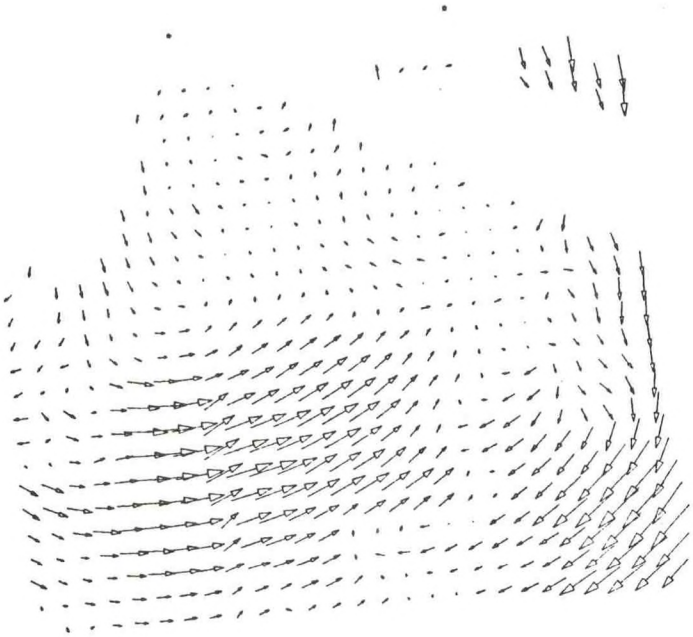
TRUE NORTH



2140 12-OCT-82
2150 12*OCT*82

8.0 KM . 200.0 CM/S

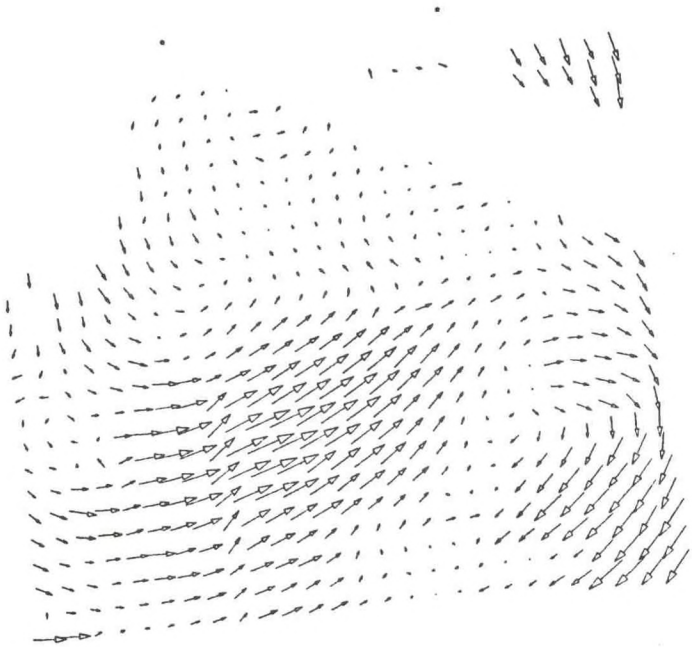
TRUE NORTH



2240 12-OCT-82
2250 12*OCT*82

8.0 KM , 200.0 CM/S

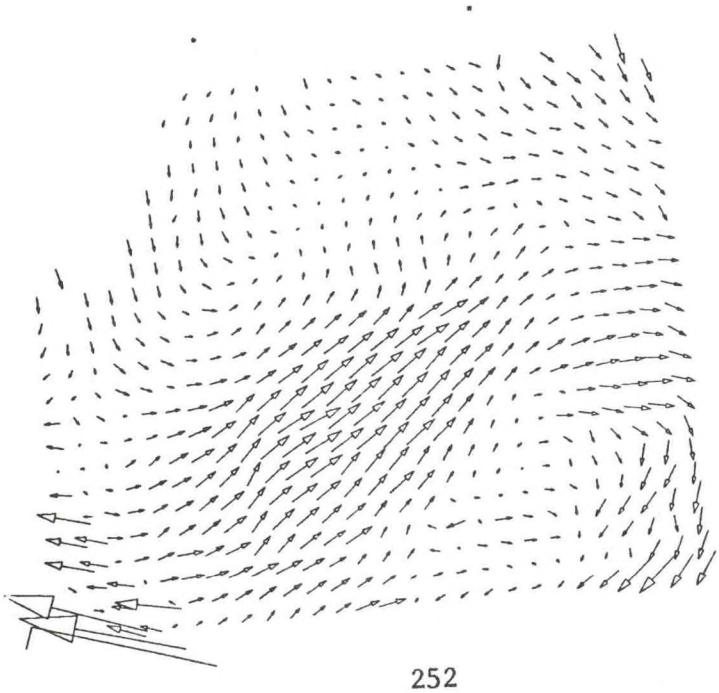
TRUE NORTH



2340 12-OCT-82
2350 12*OCT*82

8.0 KM , 200.0 CM/S

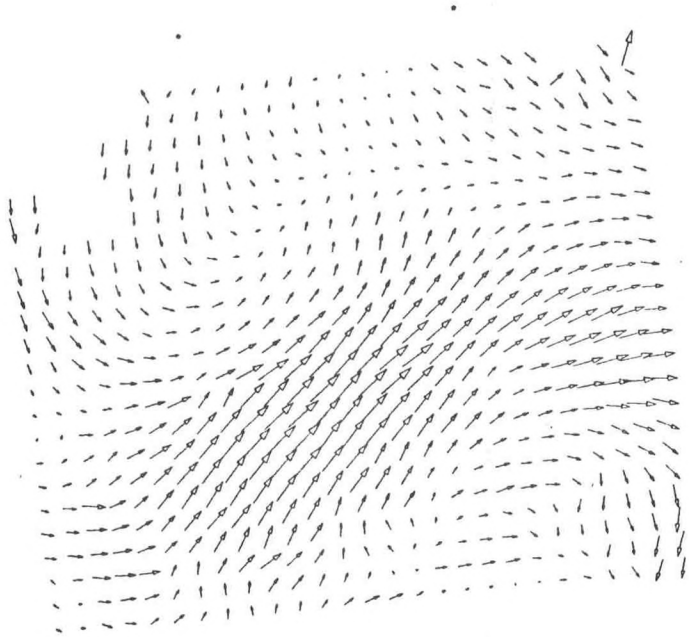
TRUE NORTH



0040 13-OCT-82
0050 13-OCT-82

8.0 KM , 200.0 CM/S

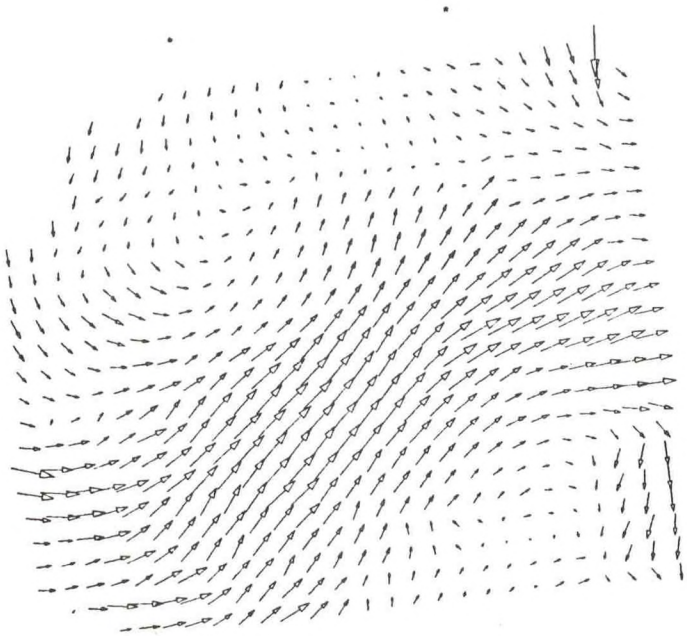
TRUE NORTH ↑



0140 13-OCT-82
0150 13-OCT-82

8.0 KM , 200.0 CM/S

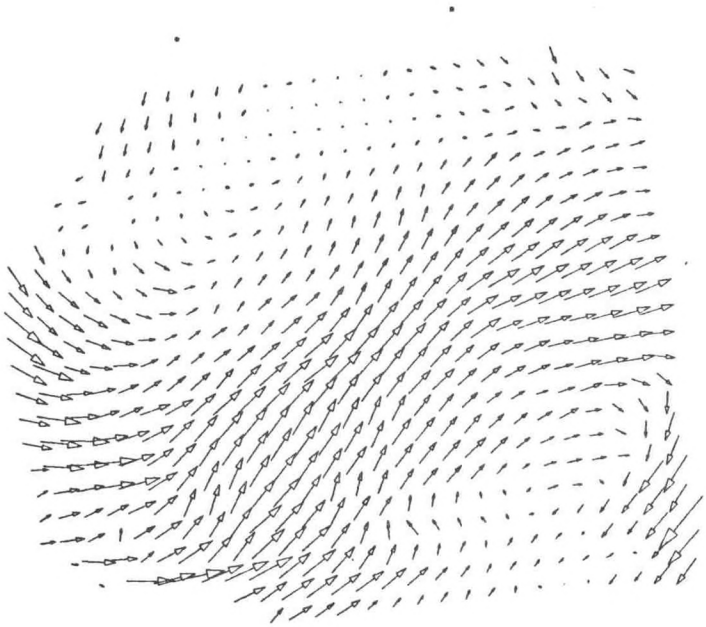
TRUE NORTH ↑



0240 13-OCT-82
0250 13-OCT-82

8.0 KM , 200.0 CM/S

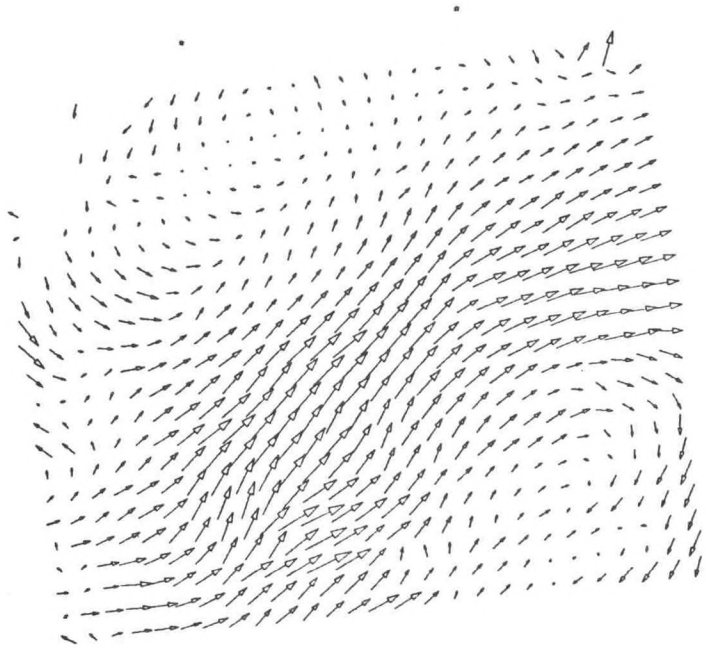
TRUE NORTH



0340 13-OCT-82
0350 13-OCT-82

8.0 KM , 200.0 CM/S

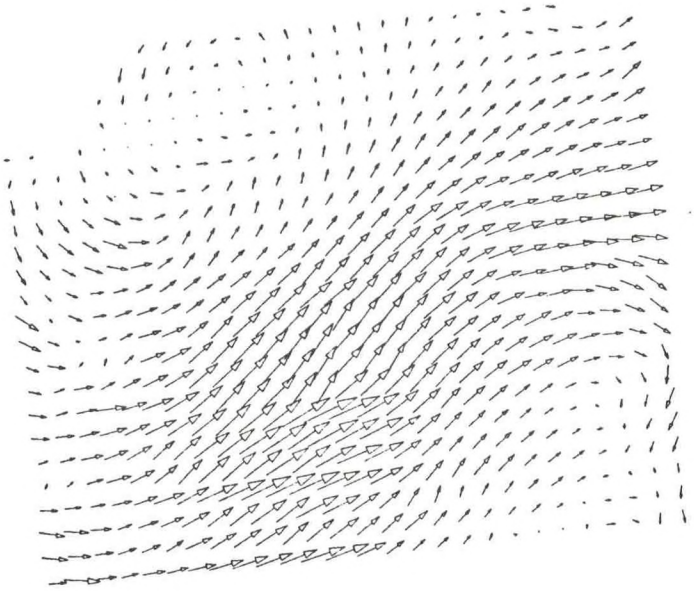
TRUE NORTH



0440 13-OCT-82
0450 13-OCT-82

8.0 KM , 200.0 CM/S

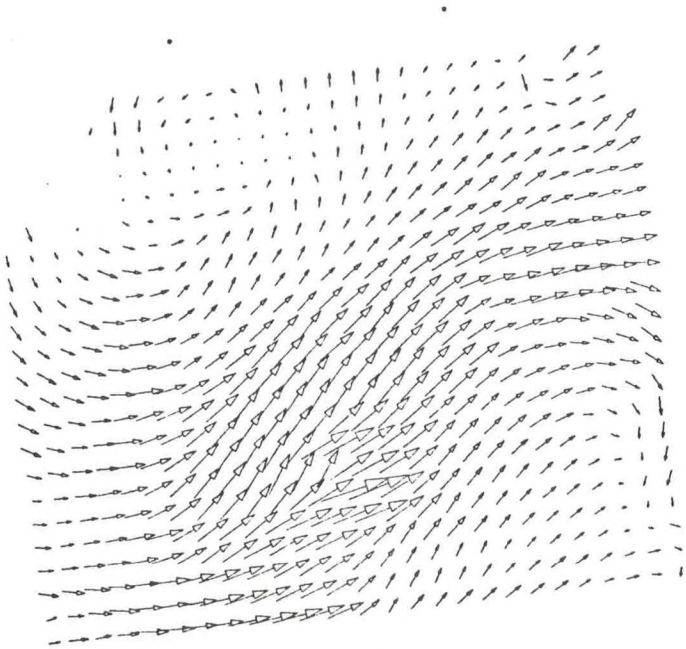
TRUE NORTH ↑



0540 13-OCT-82
0550 13-OCT-82

8.0 KM , 200.0 CM/S

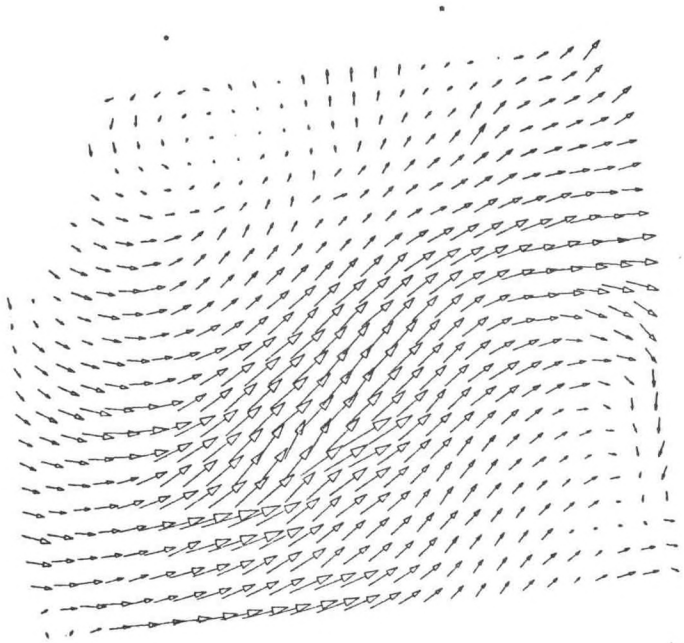
TRUE NORTH ↑



0640 13-OCT-82
0650 13-OCT-82

8.0 KM , 200.0 CM/S

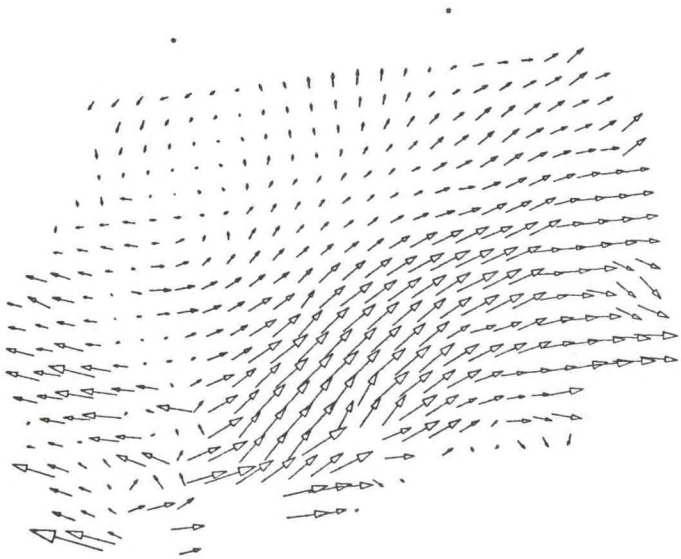
TRUE NORTH



0740 13-OCT-82
0750 13-OCT-82

8.0 KM , 200.0 CM/S

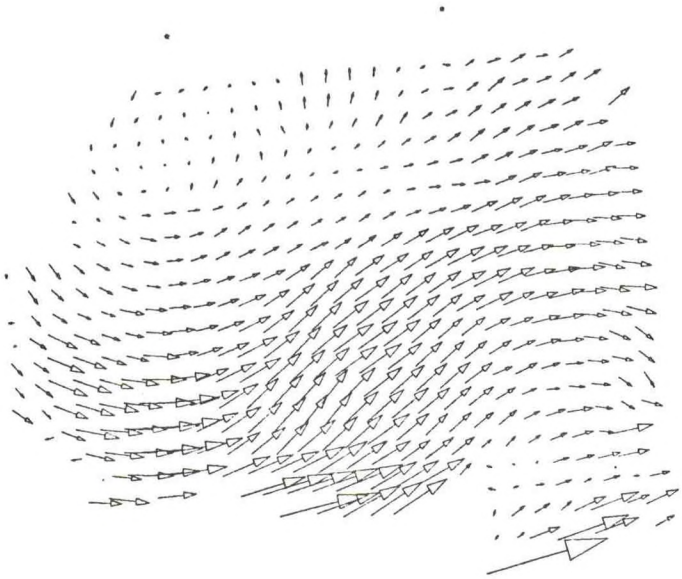
TRUE NORTH



0840 13-OCT-82
0850 13-OCT-82

8.0 KM , 200.0 CM/S

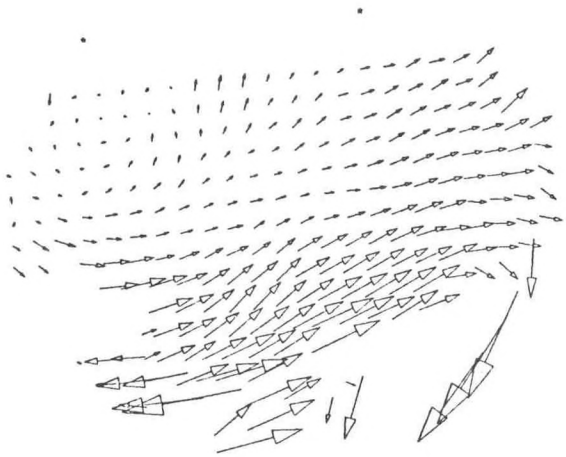
TRUE NORTH



0940 13-OCT-82
0950 13*OCT*82

8.0 KM , 200.0 CM/S

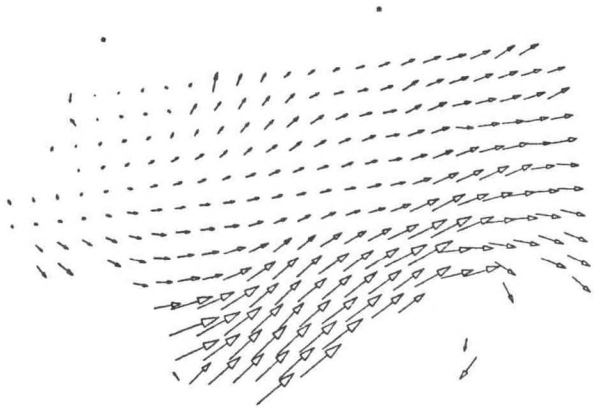
TRUE NORTH



1040 13-OCT-82
1050 13-OCT-82

8.0 KM , 200.0 CM/S

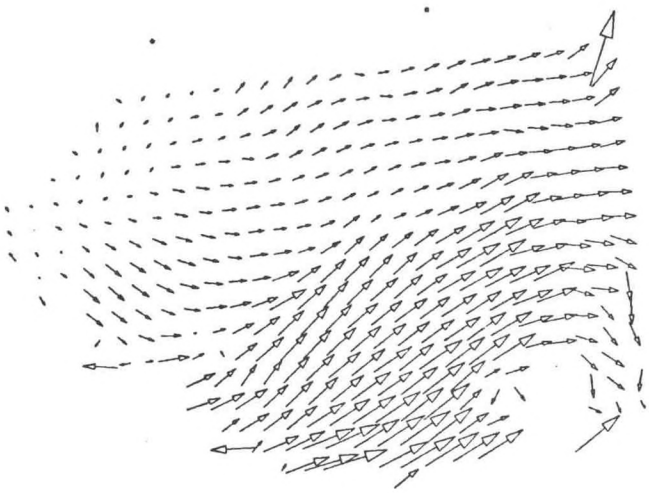
TRUE NORTH



1140 13-OCT-82
1150 13-OCT-82

8.0 KM , 200.0 CM/S

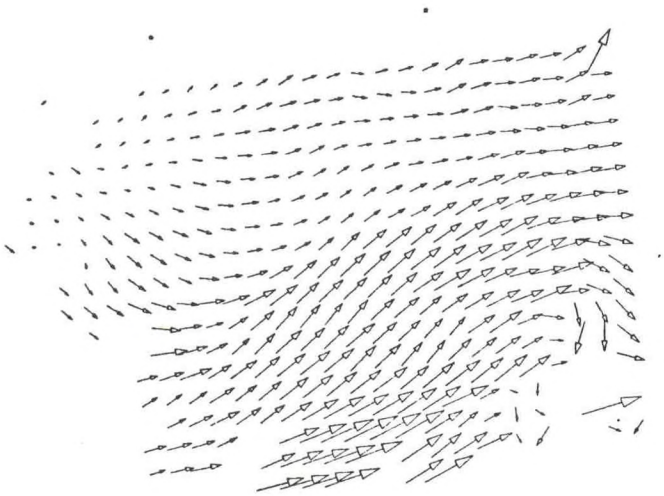
TRUE NORTH



1240 13-OCT-82
1250 13-OCT-82

8.0 KM , 200.0 CM/S

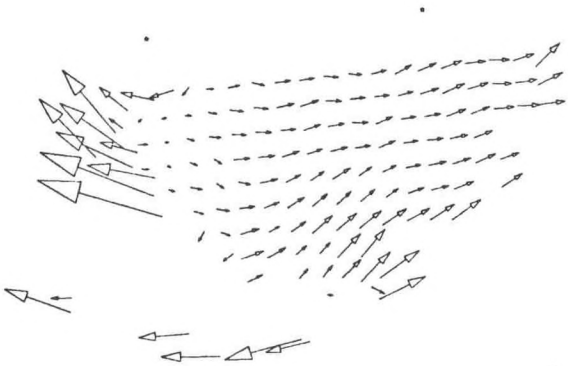
TRUE NORTH



1340 13-OCT-82
1350 13*OCT*82

8.0 KM , 200.0 CM/S

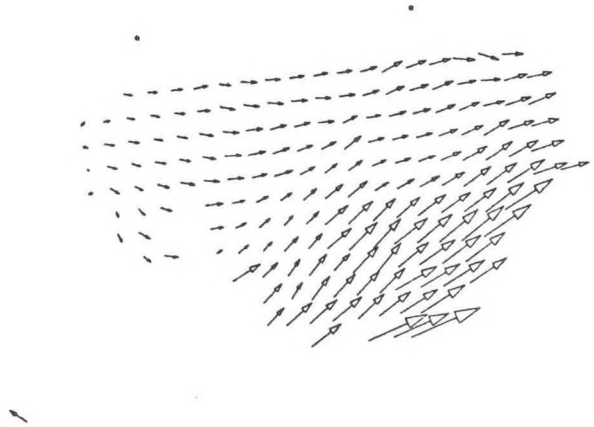
TRUE NORTH



1440 13-OCT-82
1450 13-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1540 13-OCT-82
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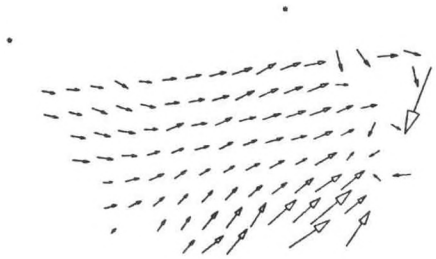
8.0 KM , 200.0 CM/S

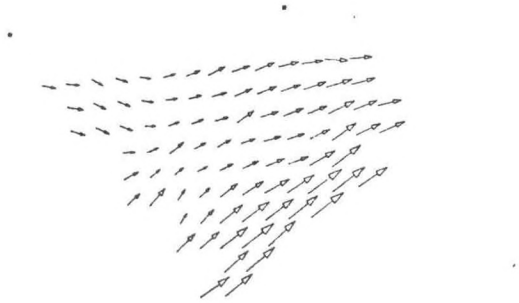
TRUE NORTH



1640 13-OCT-82
1650 13-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1740 13-OCT-82
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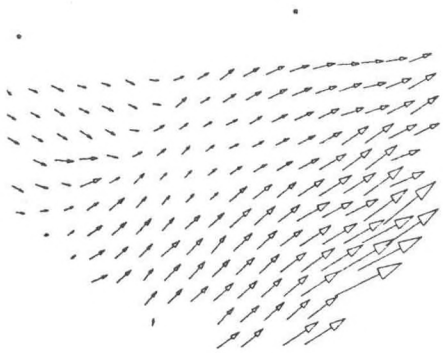
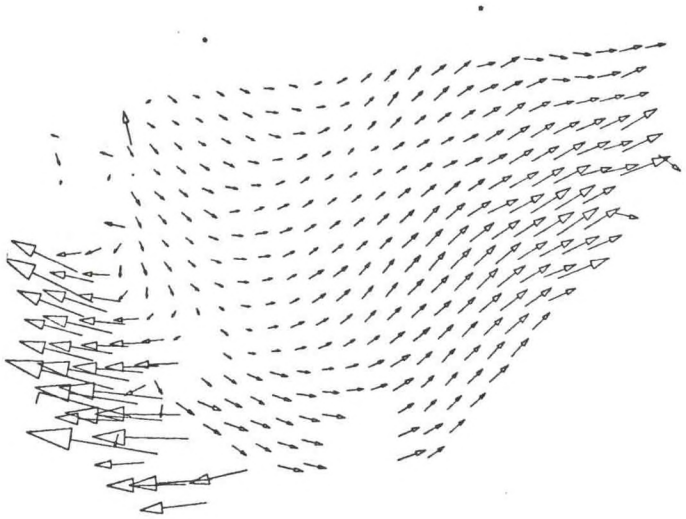
TRUE NORTH



1840 13-OCT-82
1850 13-OCT-82

8.0 KM , 200.0 CM/S

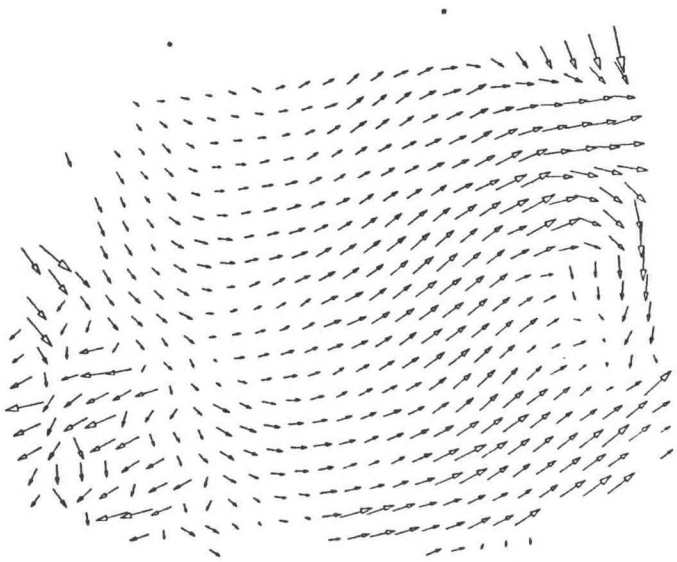
TRUE NORTH



1940 13-OCT-82
1950 13-OCT-82

8.0 KM , 200.0 CM/S

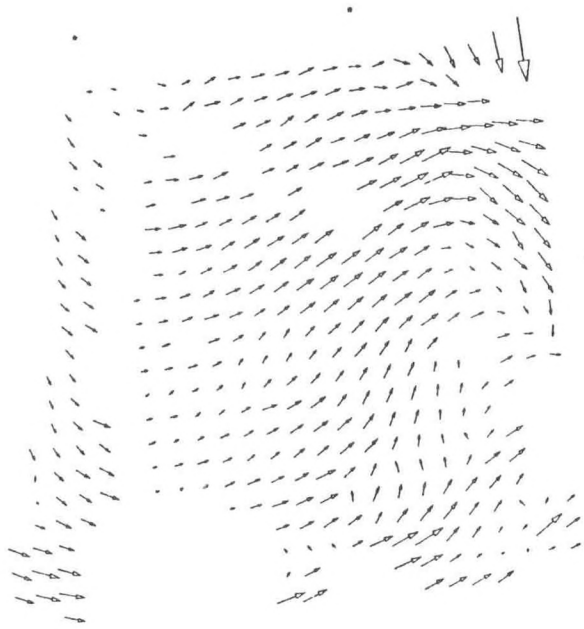
TRUE NORTH



2040 13-OCT-82
2050 13-OCT-82

8.0 KM , 200.0 CM/S

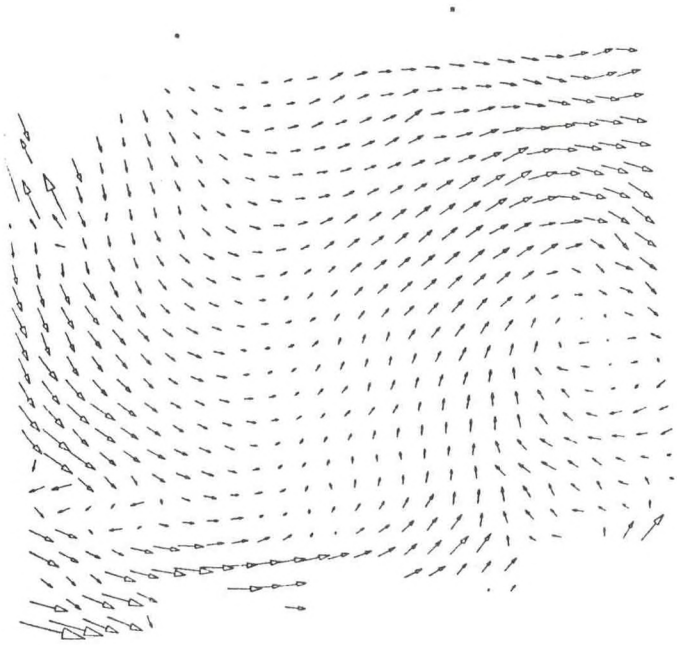
TRUE NORTH



2140 13-OCT-82
2150 13-OCT-82

8.0 KM , 200.0 CM/S

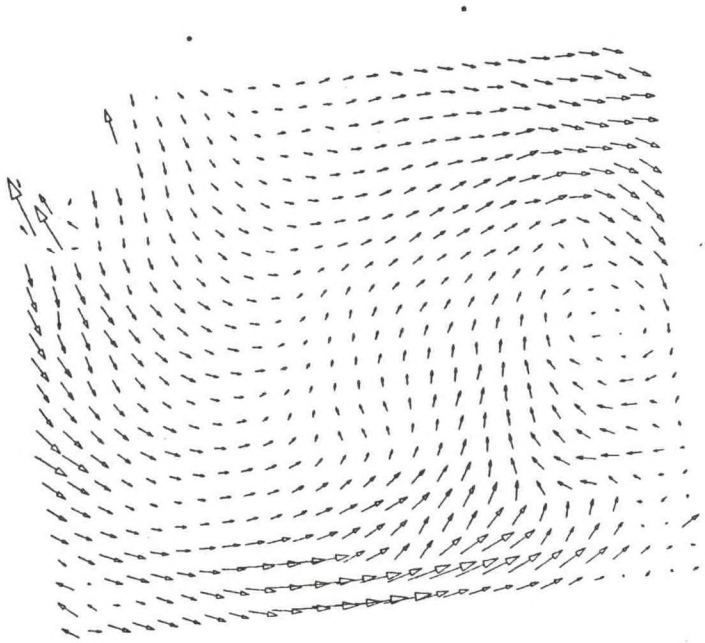
TRUE NORTH



2240 13-OCT-82
2250 13-OCT-82

8.0 KM , 200.0 CM/S

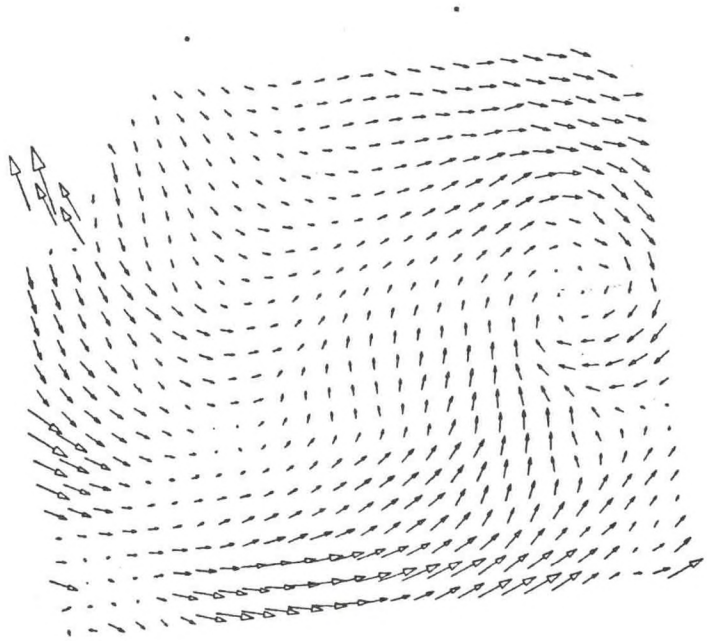
TRUE NORTH



2340 13-OCT-82
2350 13-OCT-82

8.0 KM , 200.0 CM/S

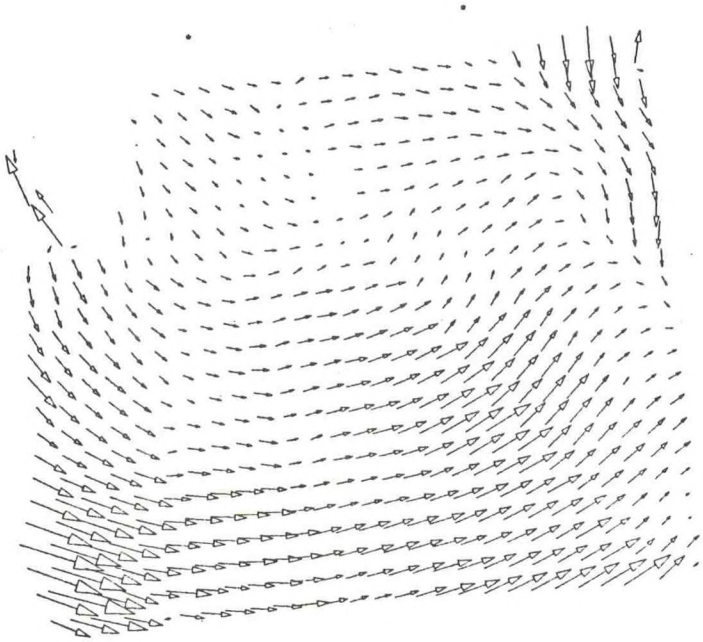
TRUE NORTH



0040 14-OCT-82
0050 14*OCT*82

8.0 KM , 200.0 CM/S

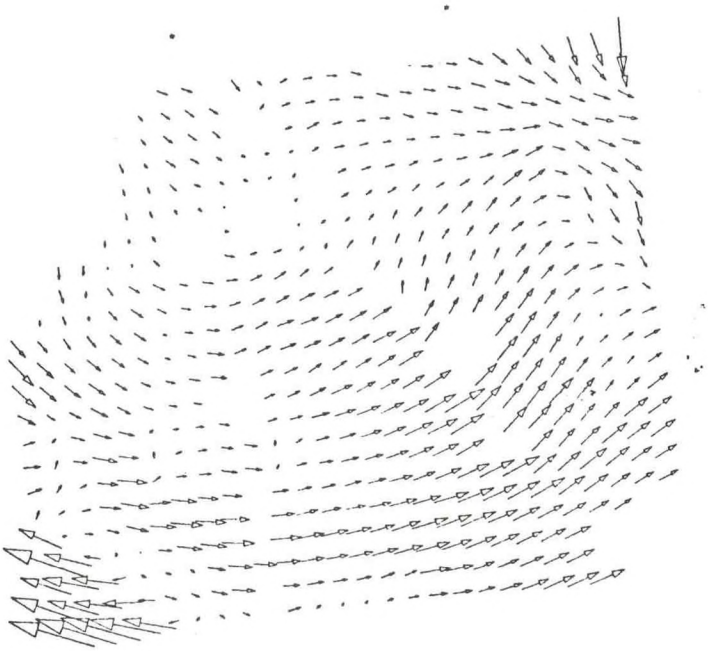
TRUE NORTH



0140 14-OCT-82
0150 14*OCT*82

8.0 KM , 200.0 CM/S

TRUE NORTH



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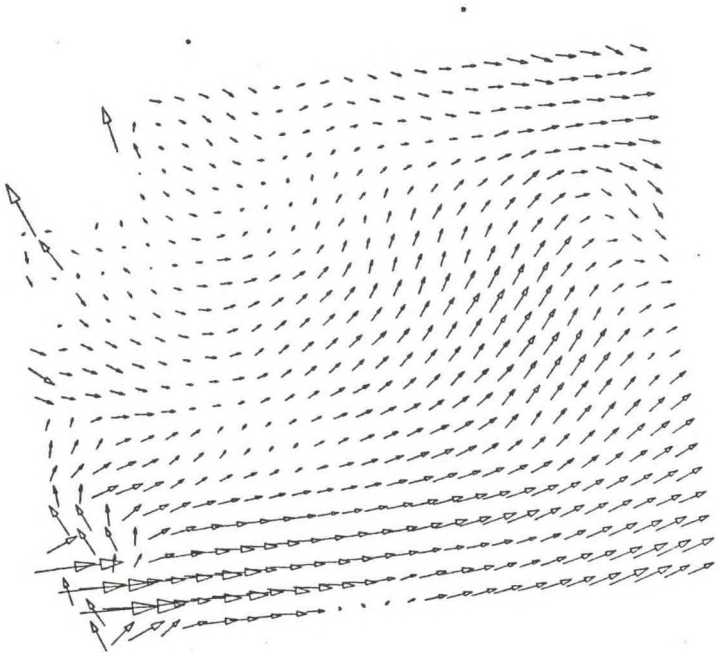
TRUE NORTH



0340 14-OCT-82
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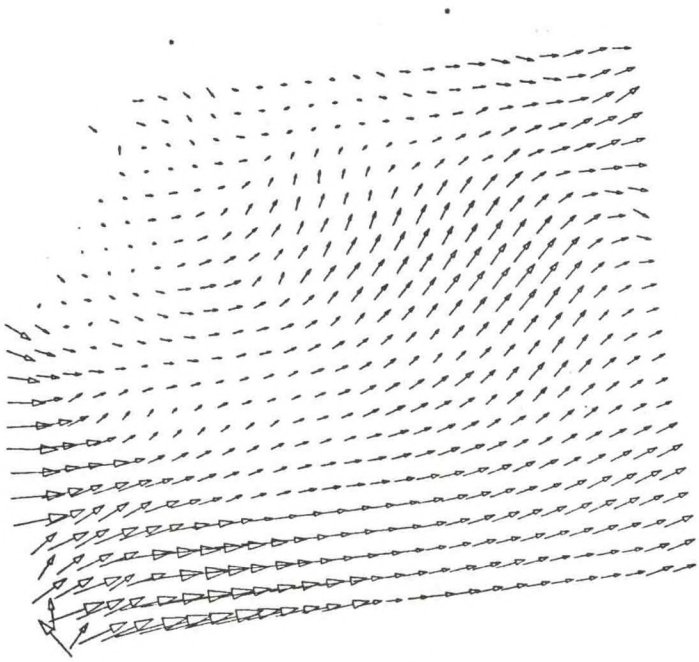
8.0 KM , 200.0 CM/S

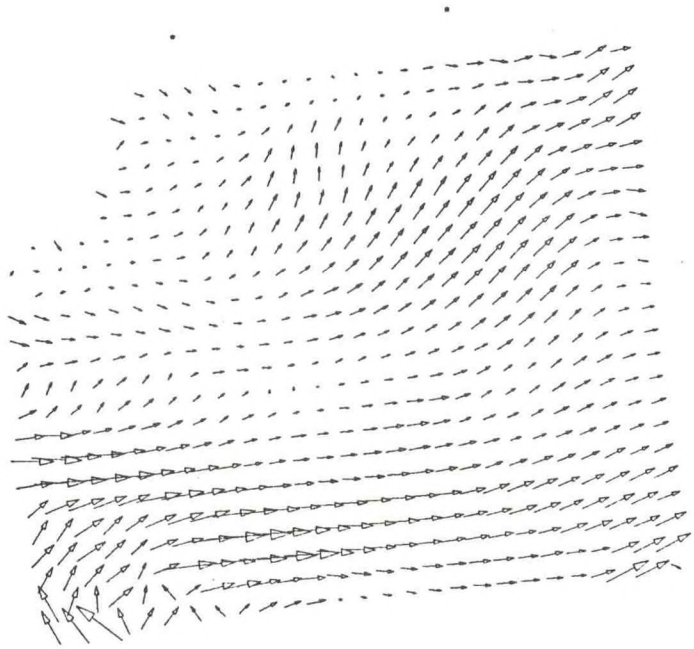
TRUE NORTH



0440 14-OCT-82
0450 14-OCT-82

8.0 KM , 200.0 CM/S

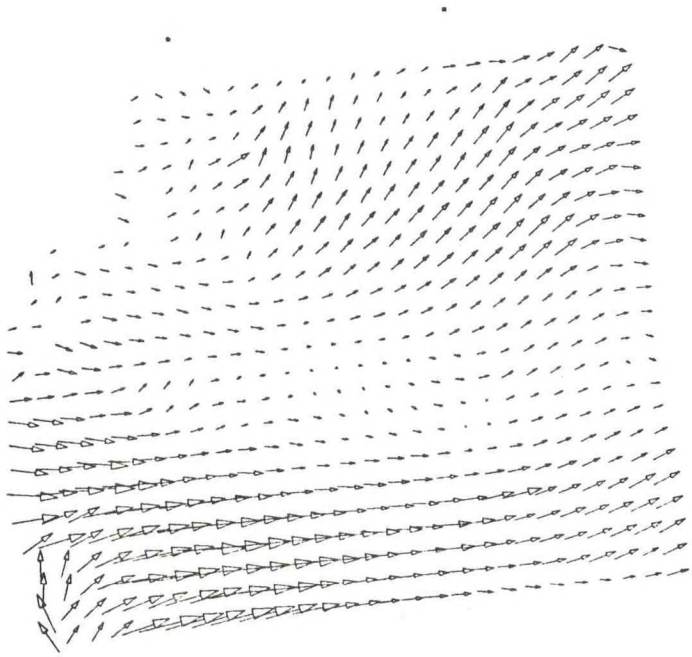
TRUE NORTH ↑



0540 14-OCT-82
0550 14-OCT-82

8.0 KM , 200.0 CM/S

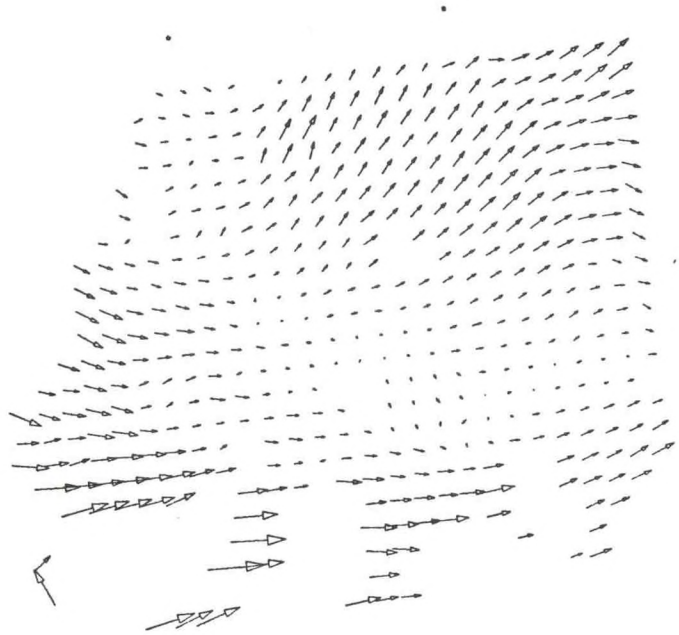
TRUE NORTH ↑



0640 14-OCT-82
0650 14*OCT*82

8.0 KM , 200.0 CM/S

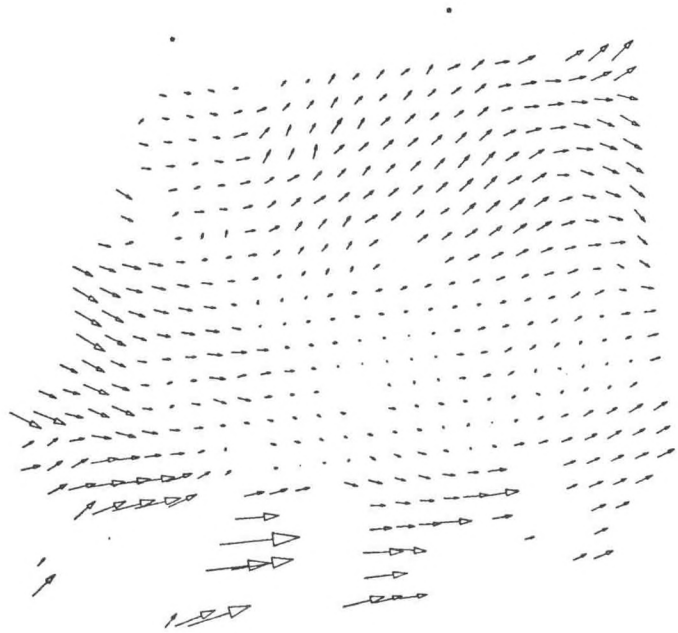
TRUE NORTH



0740 14-OCT-82
0750 14*OCT*82

8.0 KM , 200.0 CM/S

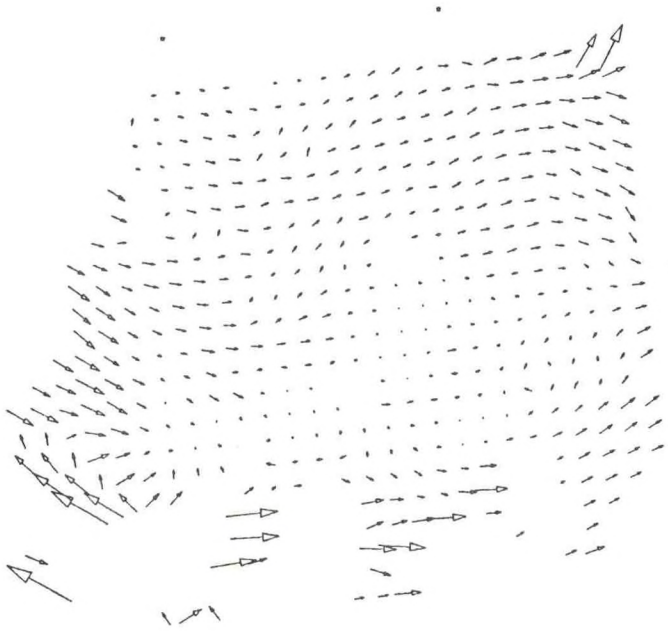
TRUE NORTH



0840 14-OCT-82
0850 14*OCT*82

8.0 KM , 200.0 CM/S

TRUE NORTH



0940 14-OCT-82
0950 14*OCT*82

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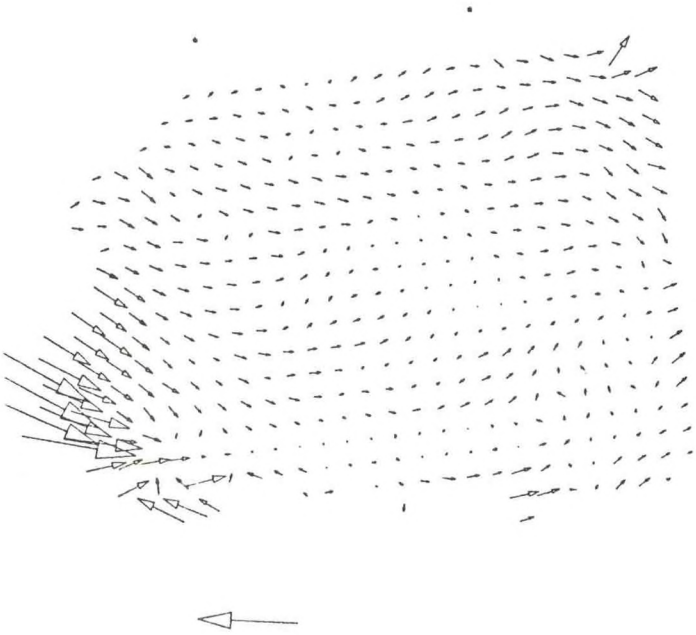
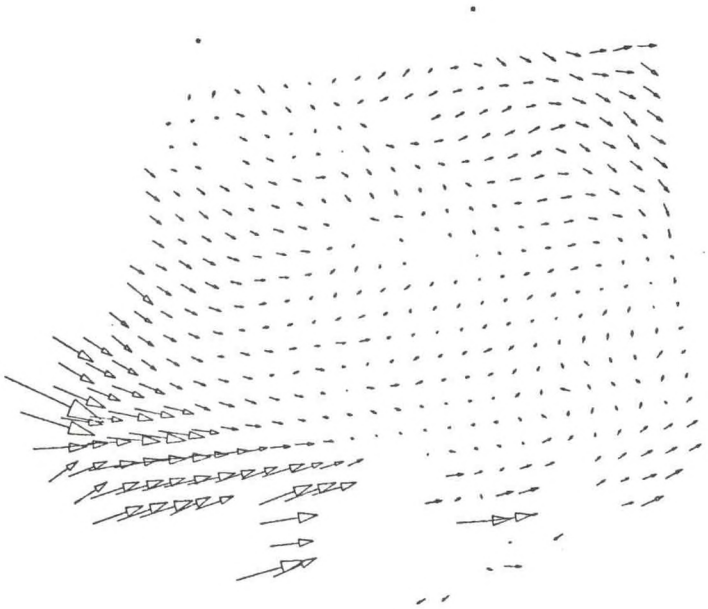
TRUE NORTH



1040 14-OCT-82
1050 14*OCT*82

8.0 KM . 200.0 CM/S

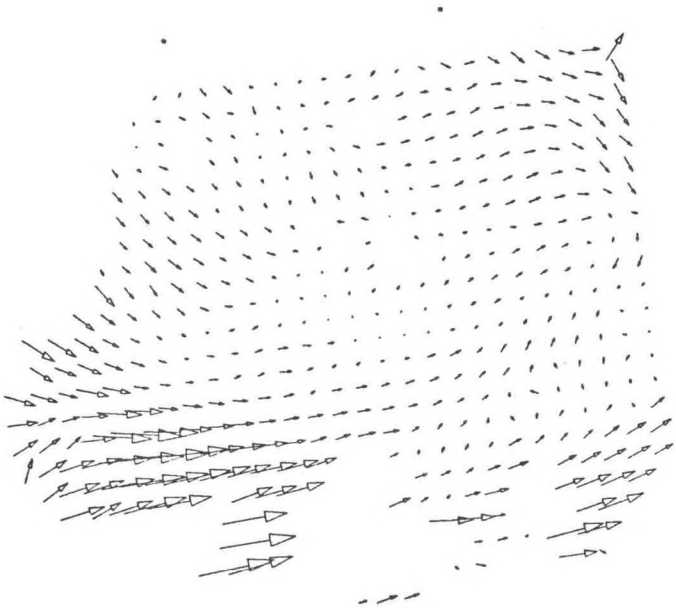
TRUE NORTH



1140 14-OCT-82
1150 14*OCT*82

8.0 KM . 200.0 CM/S

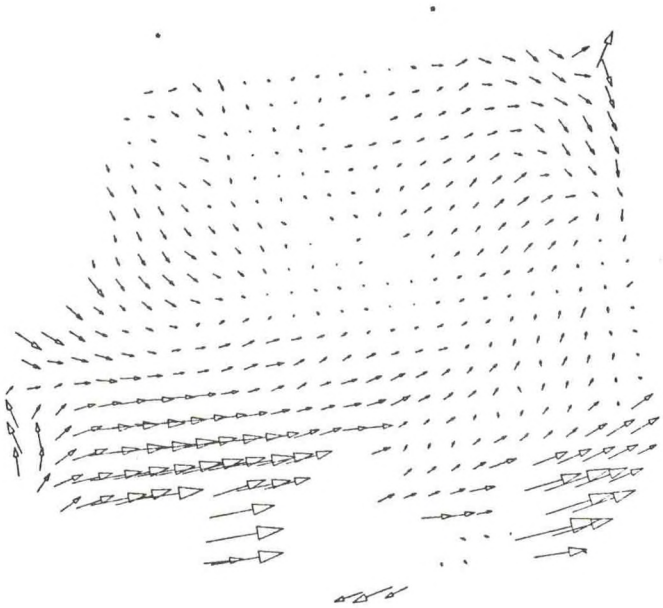
TRUE NORTH



1240 14-OCT-82
1250 14-OCT-82

8.0 KM , 200.0 CM/S

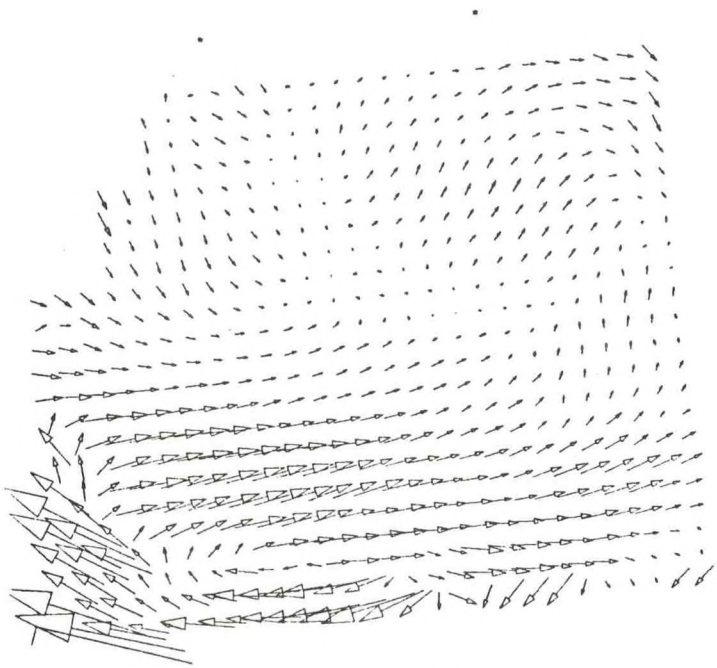
TRUE NORTH



1340 14-OCT-82
1350 14-OCT-82

8.0 KM , 200.0 CM/S

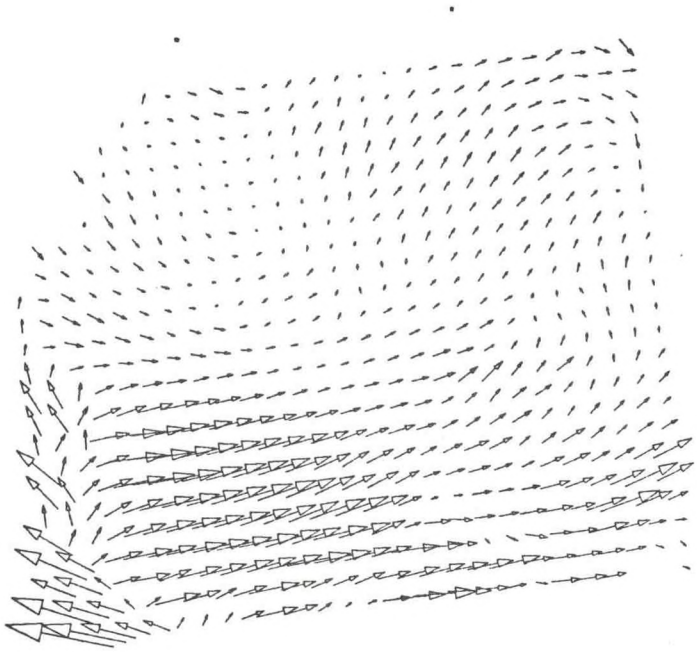
TRUE NORTH



1440 14-OCT-82
1450 14-OCT-82

8.0 KM , 200.0 CM/S

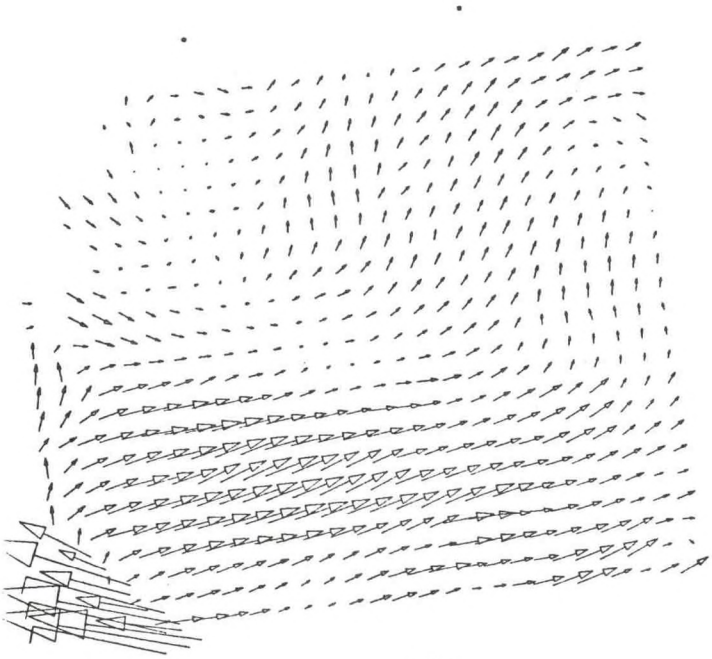
TRUE NORTH



1540 14-OCT-82
1550 14-OCT-82

8.0 KM , 200.0 CM/S

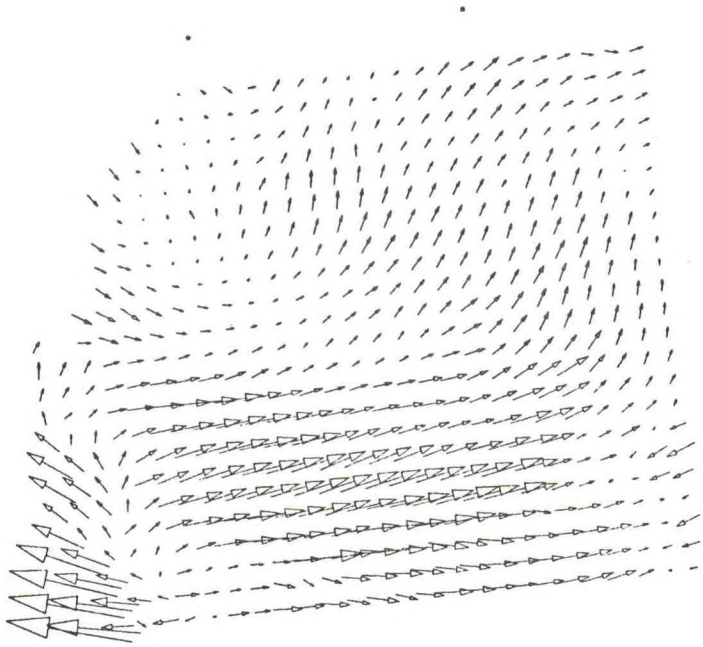
TRUE NORTH



1640 14-OCT-82
1650 14-OCT-82

8.0 KM , 200.0 CM/S

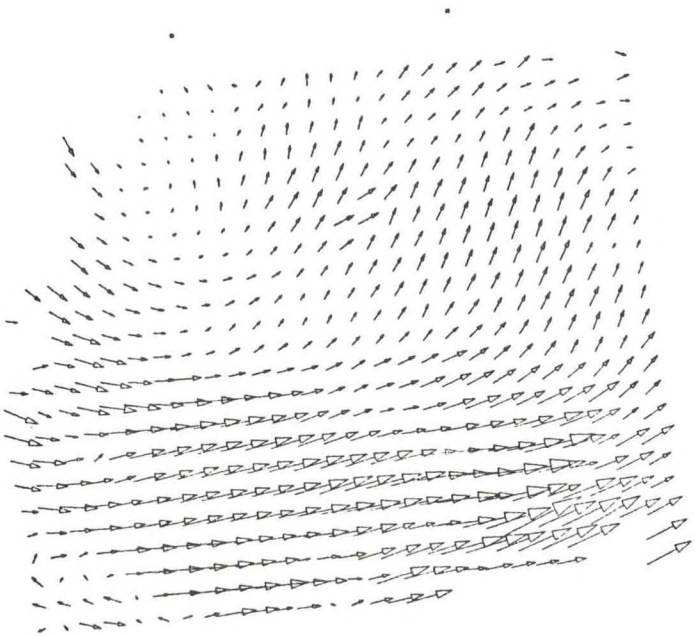
TRUE NORTH



1740 14-OCT-82
1750 14-OCT-82

8.0 KM , 200.0 CM/S

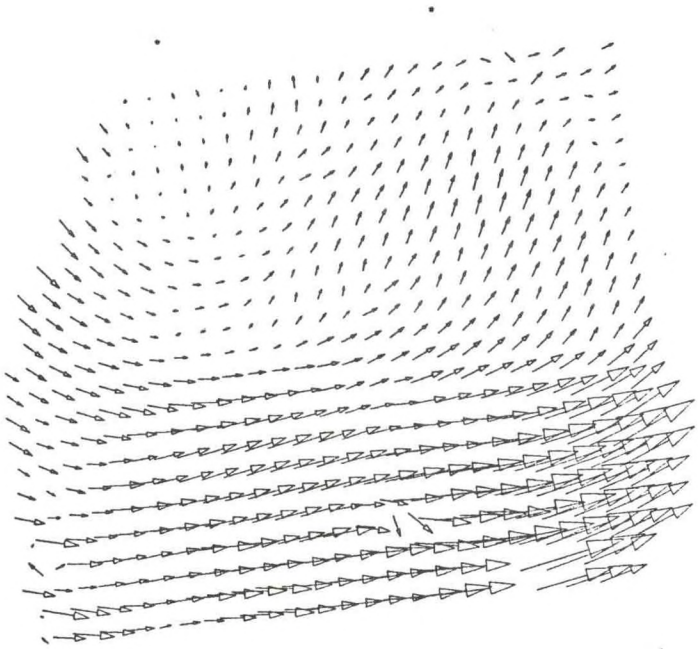
TRUE NORTH



1840 14-OCT-82
1850 14-OCT-82

8.0 KM , 200.0 CM/S

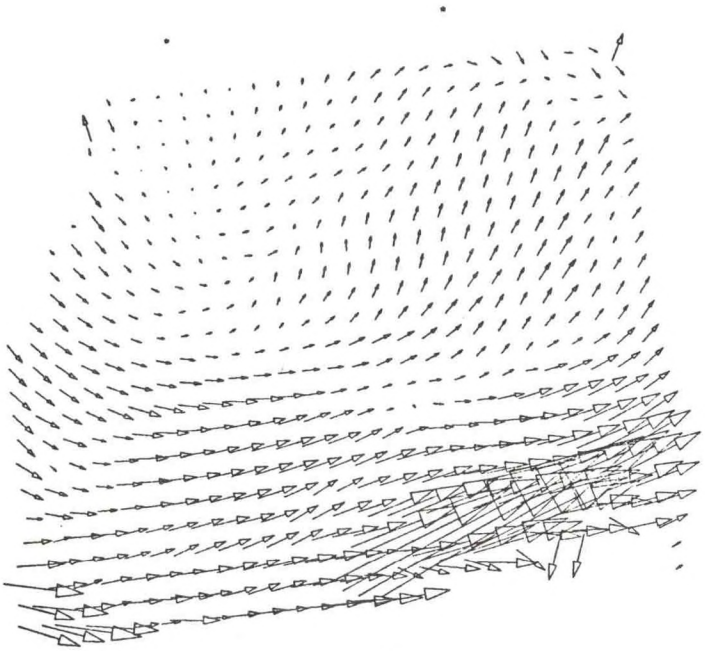
TRUE NORTH



1940 14-OCT-82
1950 14-OCT-82

8.0 KM , 200.0 CM/S

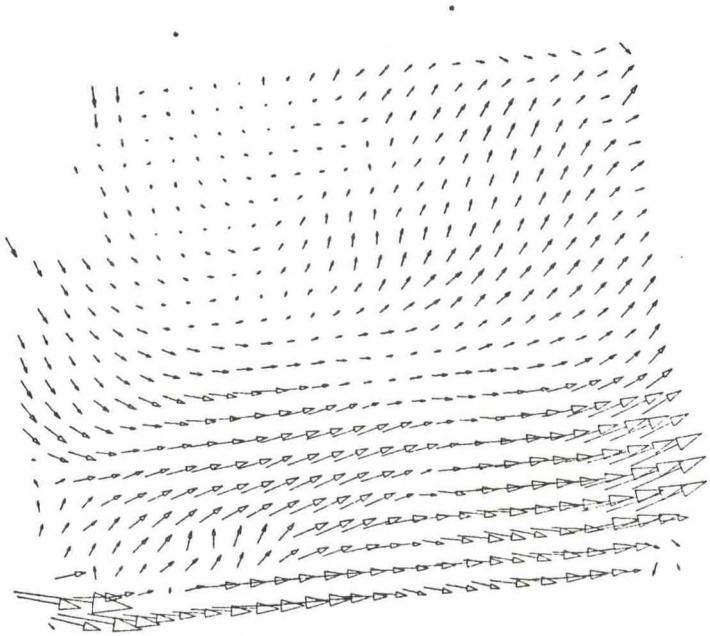
TRUE NORTH



2040 14-OCT-82
2050 14-OCT-82

8.0 KM , 200.0 CM/S

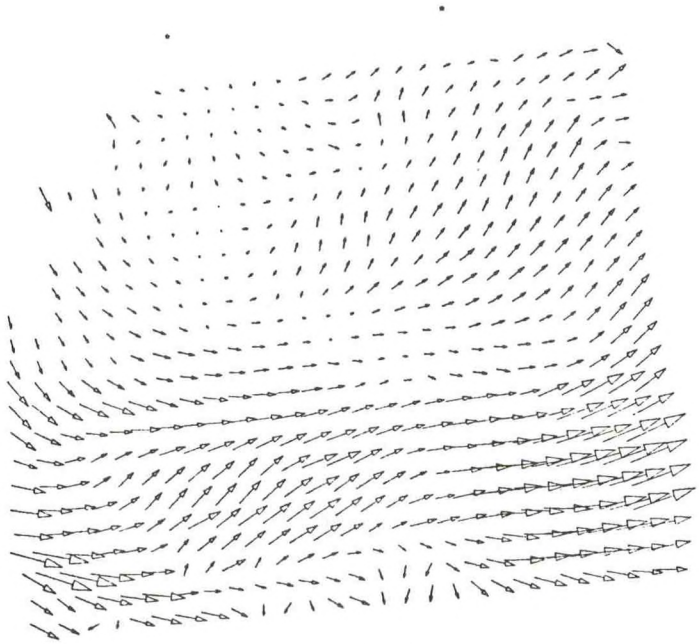
TRUE NORTH



2140 14-OCT-82
2150 14-OCT-82

8.0 KM , 200.0 CM/S

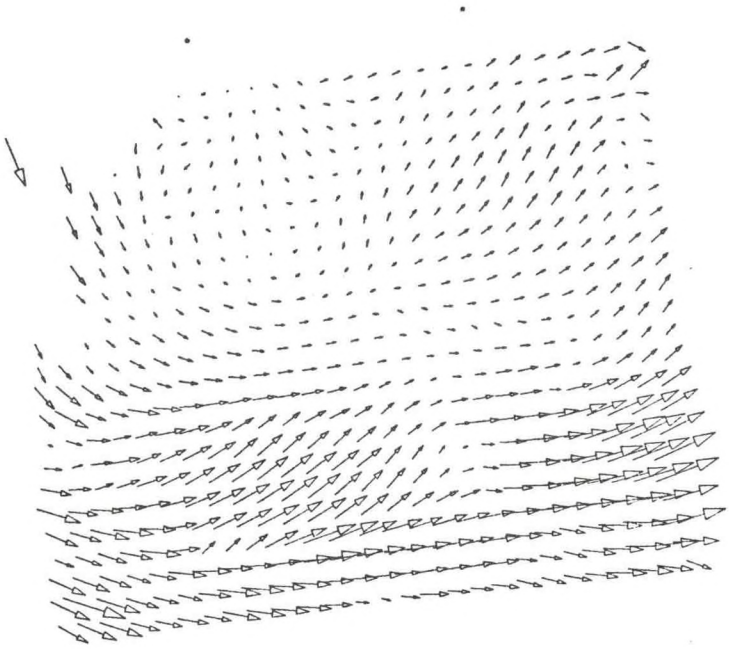
TRUE NORTH



2240 14-OCT-82
2250 14-OCT-82

8.0 KM , 200.0 CM/S

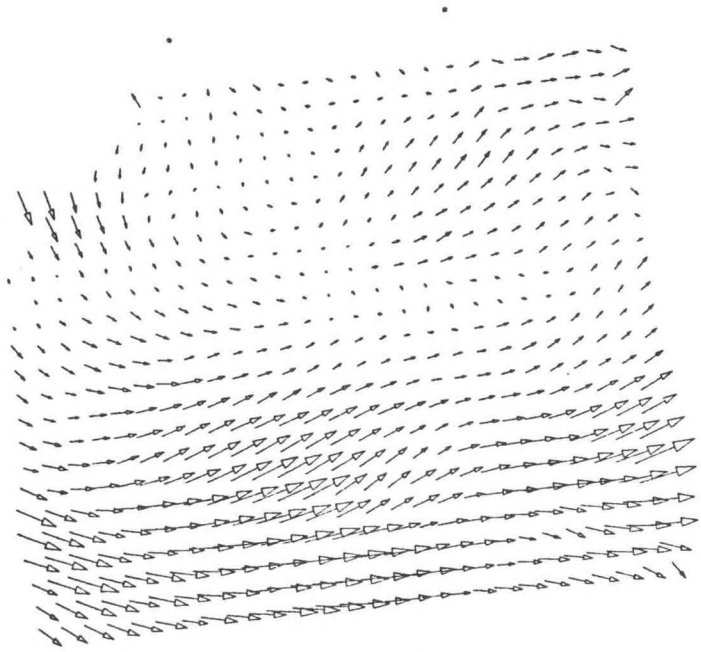
TRUE NORTH



2340 14-OCT-82
2350 14-OCT-82

8.0 KM , 200.0 CM/S

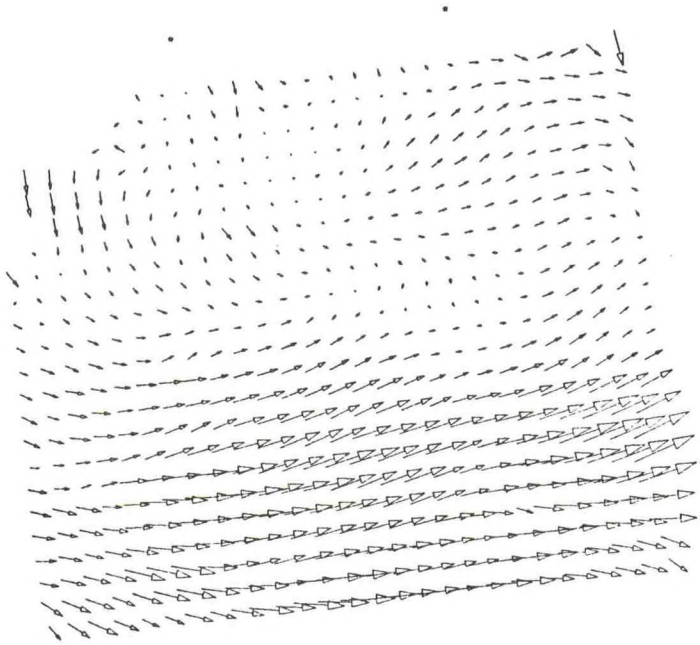
TRUE NORTH



0040 15-OCT-82
0050 15-OCT-82

8.0 KM , 200.0 CM/S

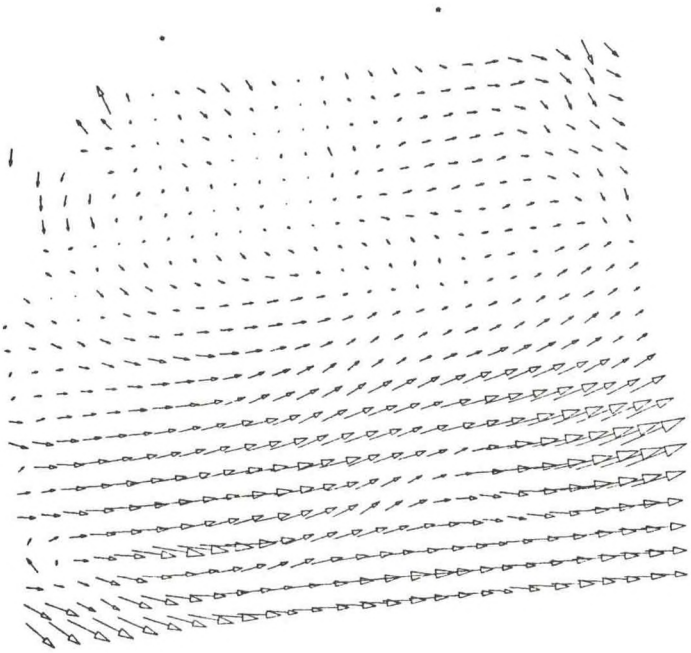
TRUE NORTH



0140 15-OCT-82
0150 15-OCT-82

8.0 KM , 200.0 CM/S

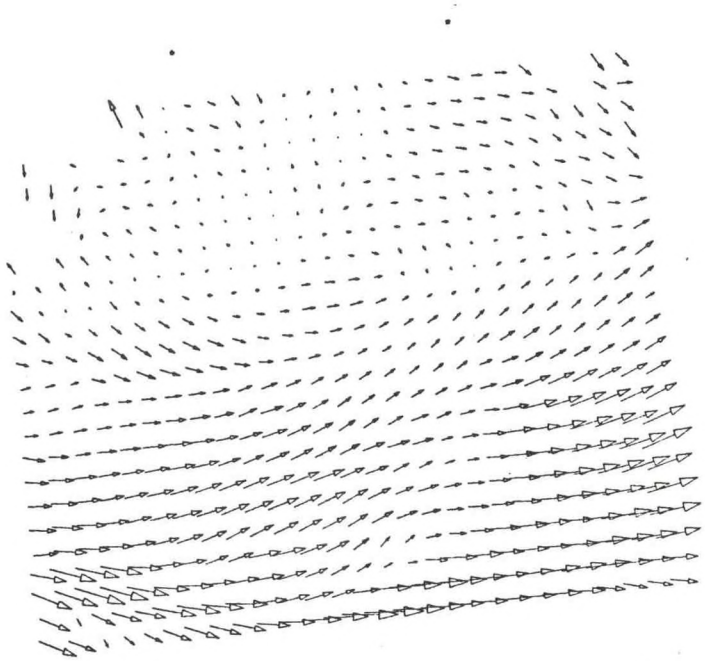
TRUE NORTH



0240 15-OCT-82
0250 15-OCT-82

8.0 KM , 200.0 CM/S

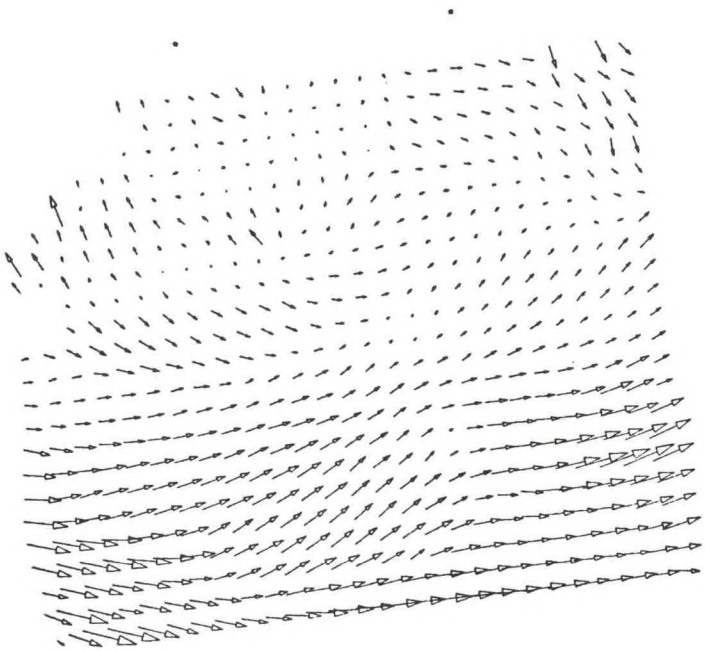
TRUE NORTH



0340 15-OCT-82
0350 15-OCT-82

8.0 KM , 200.0 CM/S

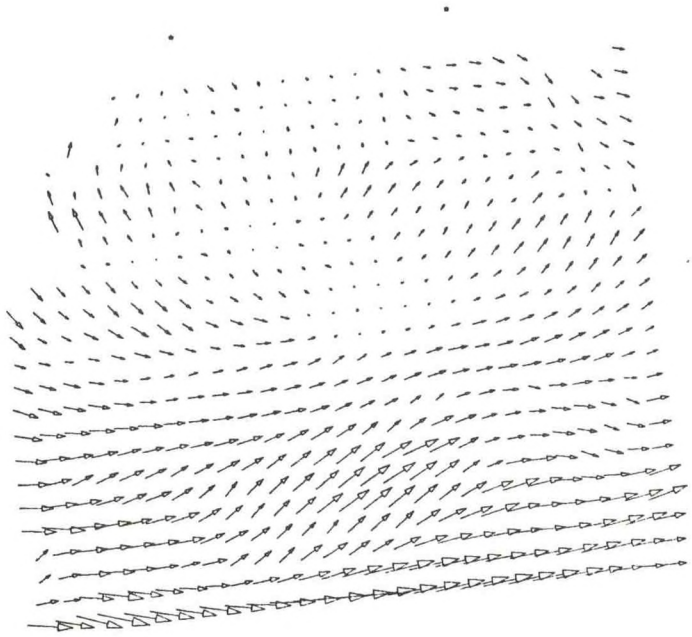
TRUE NORTH



0440 15-OCT-82
0450 15-OCT-82

8.0 KM , 200.0 CM/S

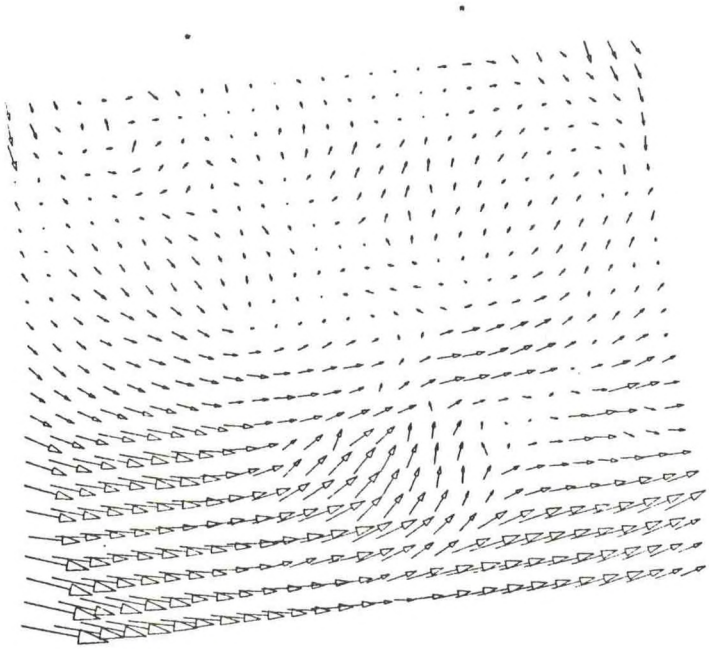
TRUE NORTH



0540 15-OCT-82
0550 15-OCT-82

8.0 KM , 200.0 CM/S

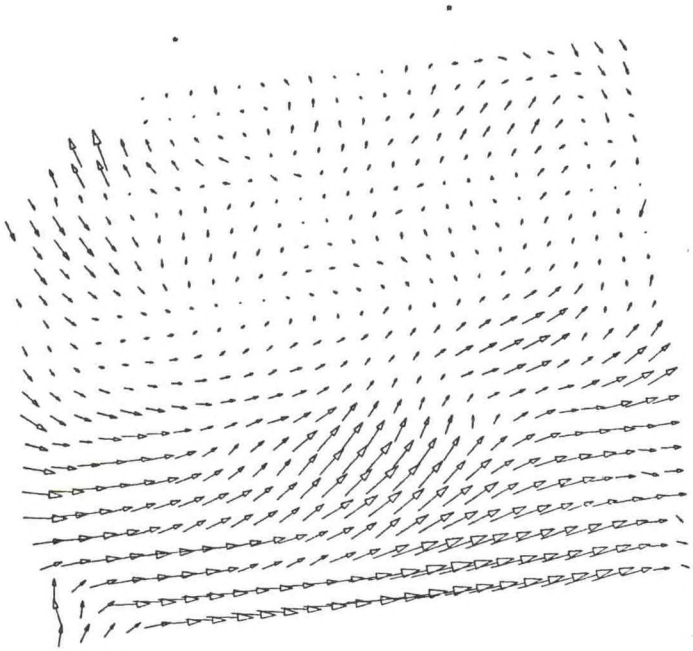
TRUE NORTH



0640 15-OCT-82
0650 15-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0740 15-OCT-82
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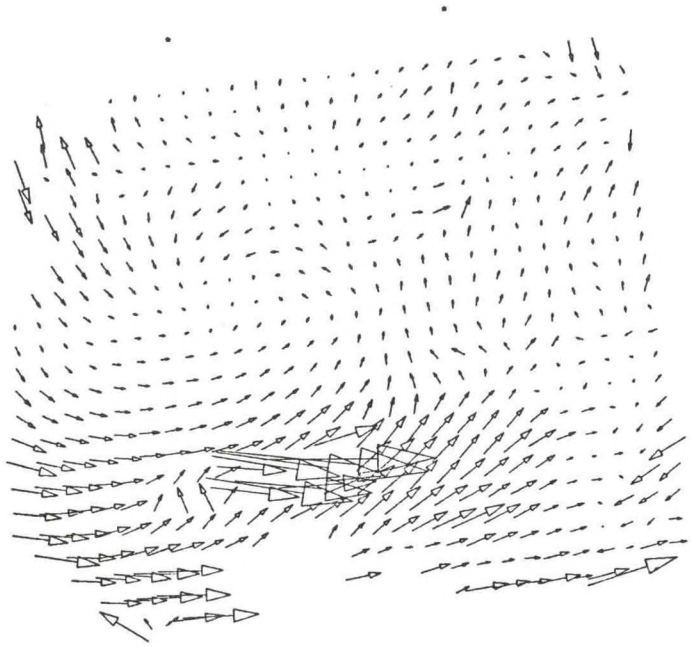

0840 15-OCT-82
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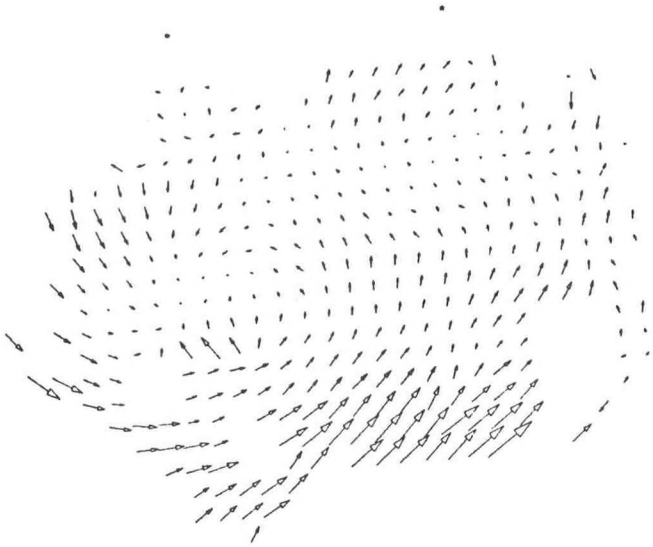
8.0 KM , 200.0 CM/S

TRUE NORTH



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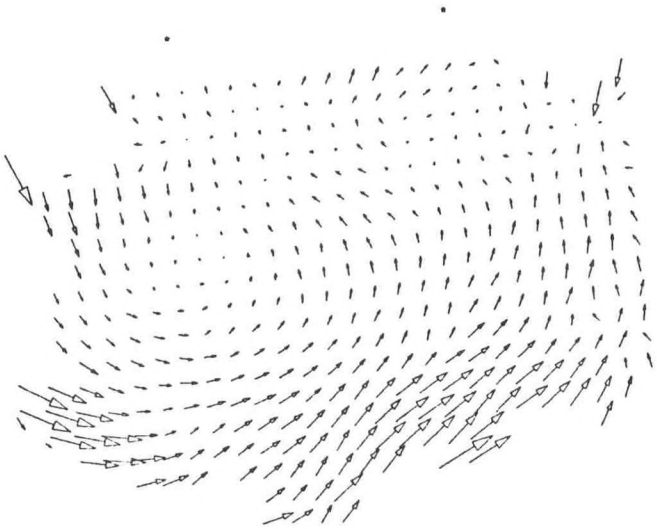

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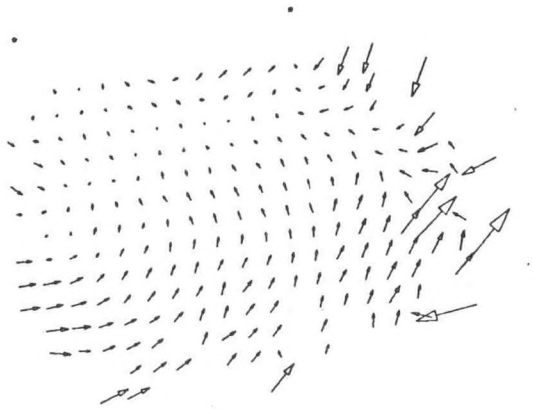

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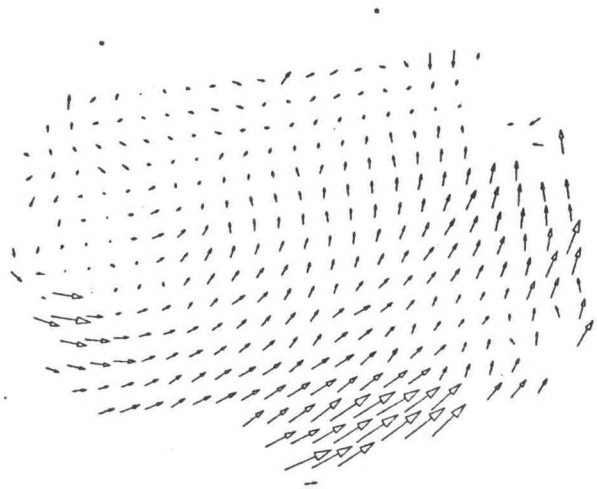

1240 15-OCT-82
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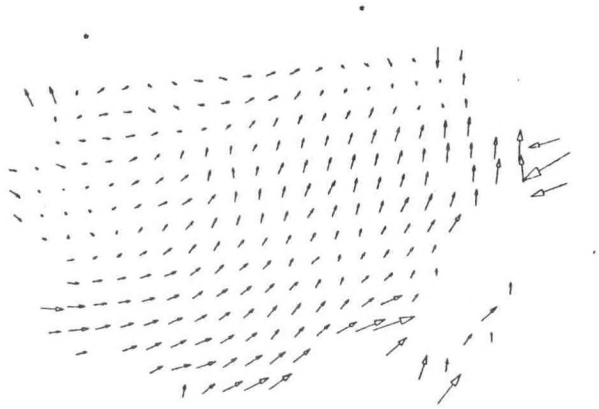

1340 15-OCT-82
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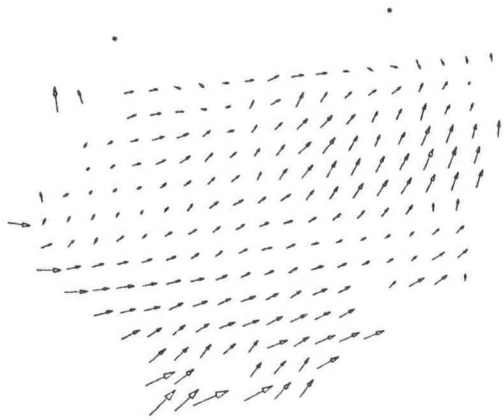

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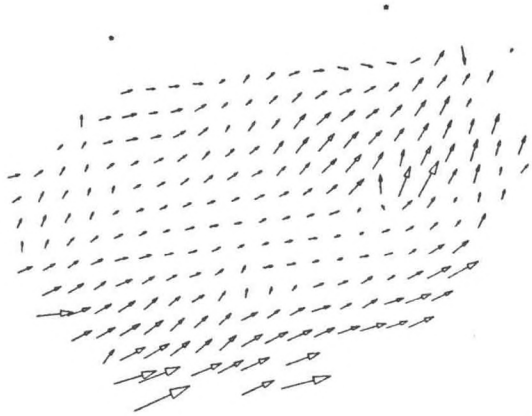

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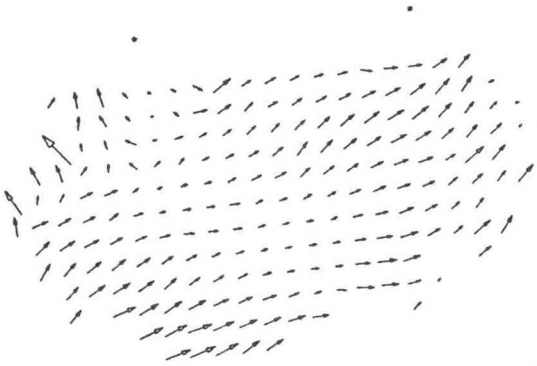

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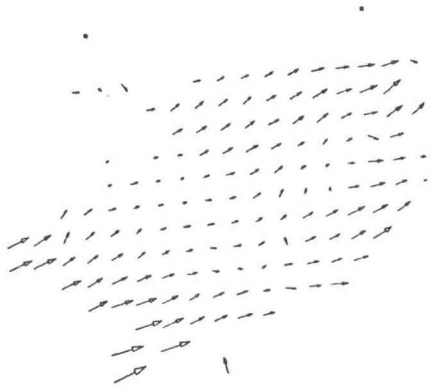

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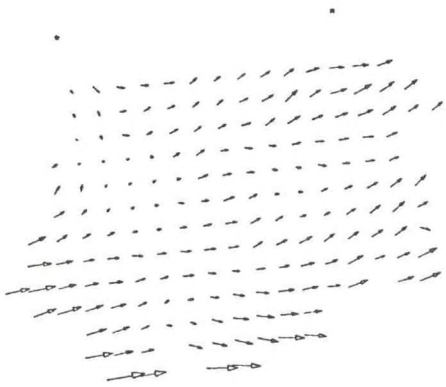
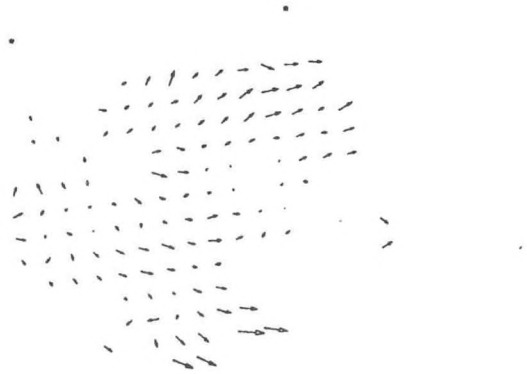


1840 15*OCT*82
1850 15-OCT-82

8.0 KM , 200.0 CM/S

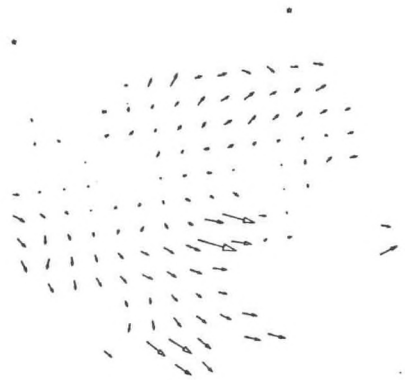
TRUE NORTH



1940 15*OCT*82
1950 15-OCT-82

8.0 KM , 200.0 CM/S

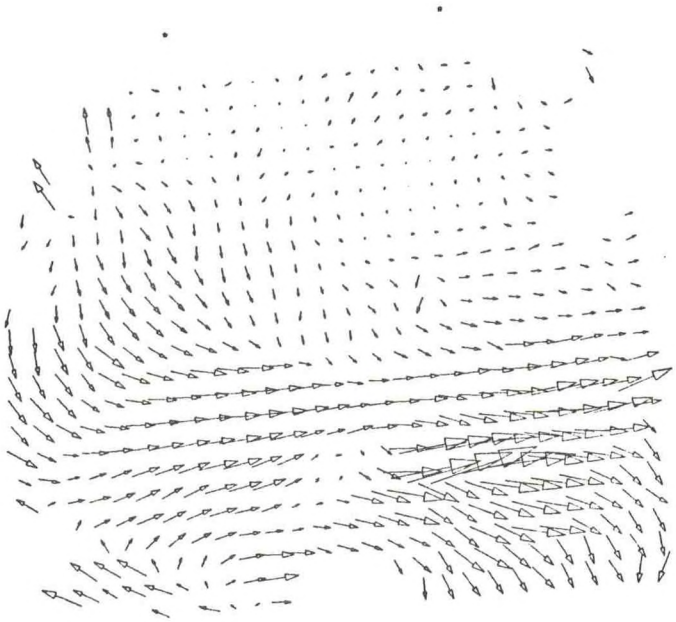
TRUE NORTH



2040 15-OCT-82
2050 15-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



2140 15-OCT-82
2150 15-OCT-82

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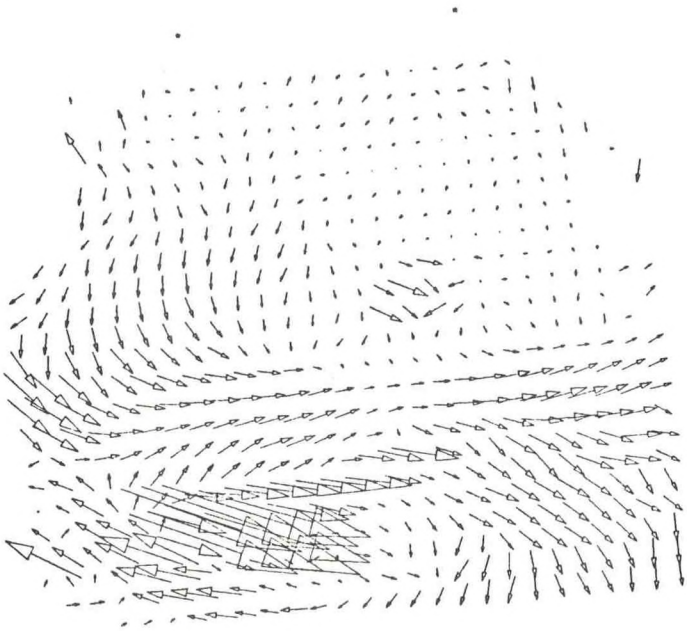
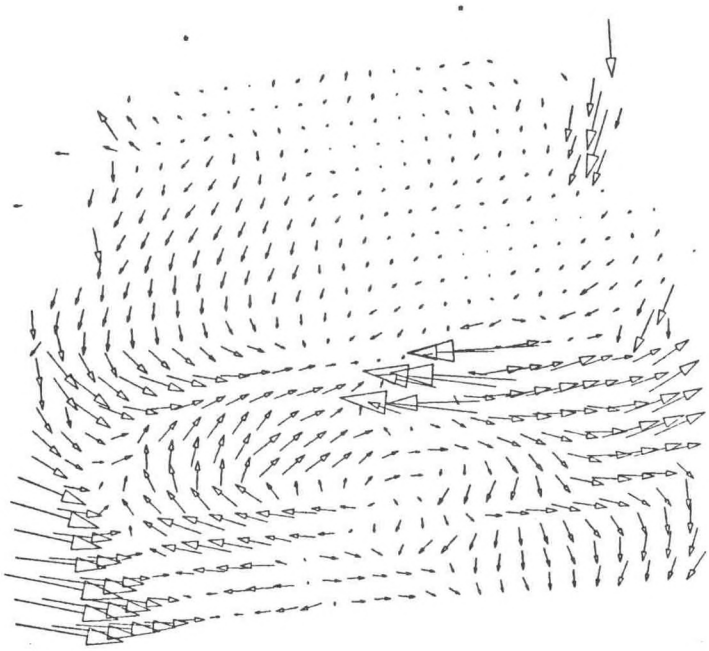


2240 15-OCT-82
2250 15-OCT-82

8.0 KM , 200.0 CM/S

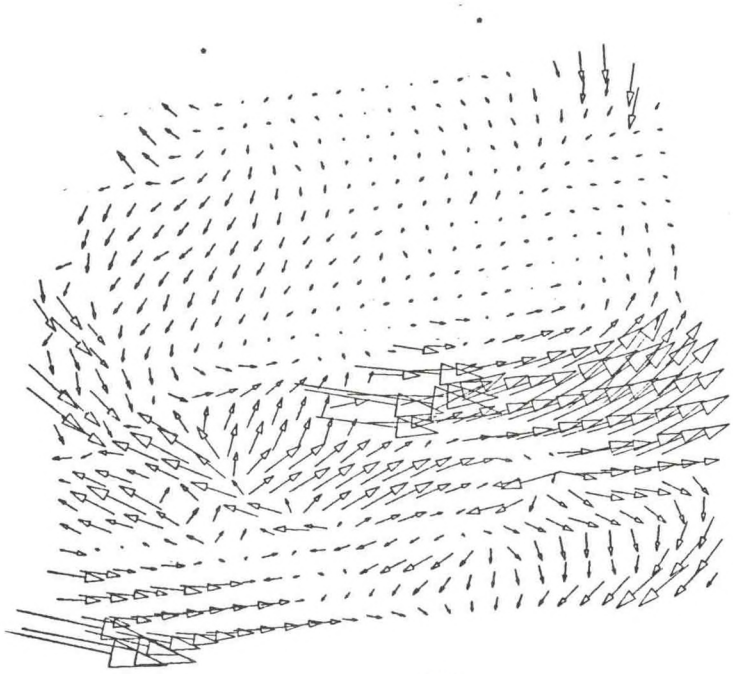
TRUE NORTH ↑



2340 15-OCT-82
2350 15-OCT-82

8.0 KM , 200.0 CM/S

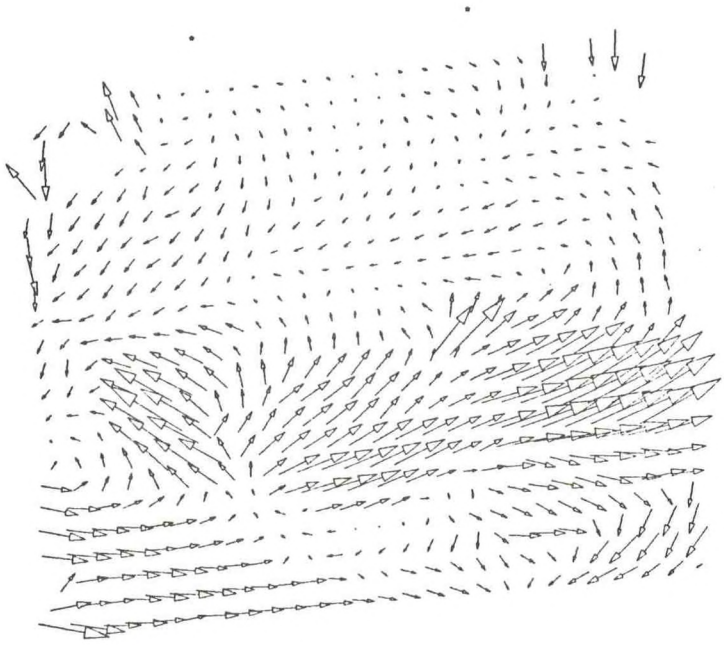
TRUE NORTH ↑



0040 16-OCT-82
0050 16-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0140 16-OCT-82
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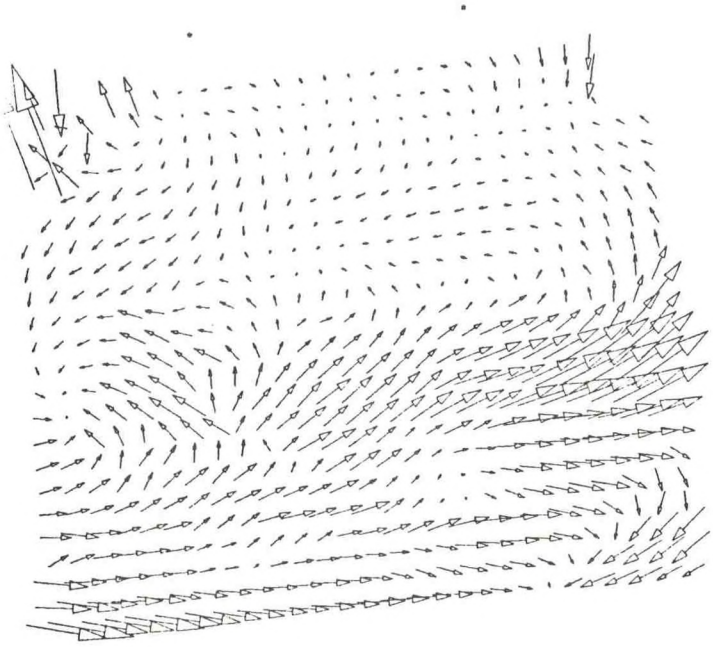

0240 16-OCT-82
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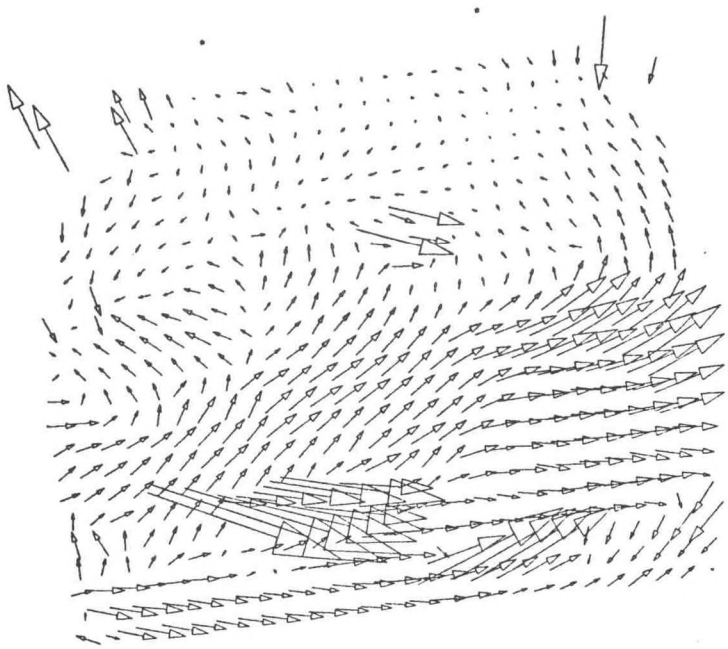
TRUE NORTH ↑



0340 16-OCT-82
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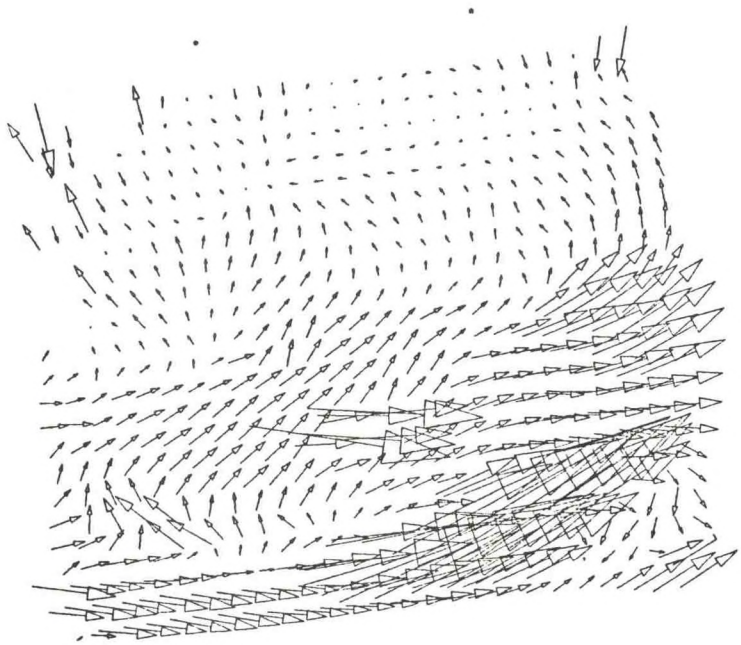
8.0 KM , 200.0 CM/S

TRUE NORTH ↑



0440 16-OCT-82
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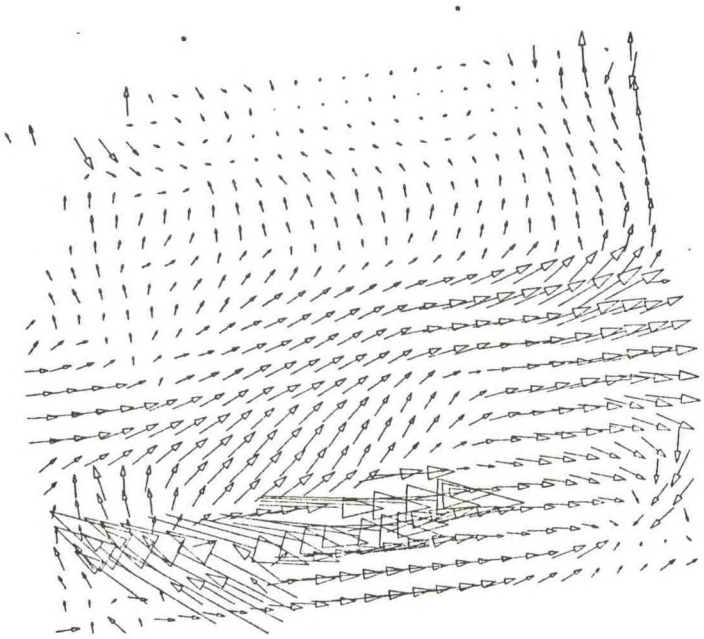

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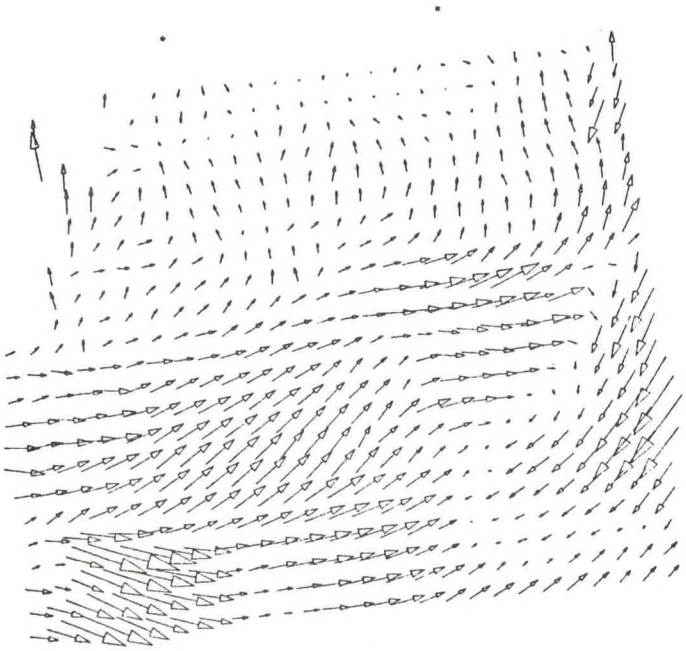

0640 16-OCT-82
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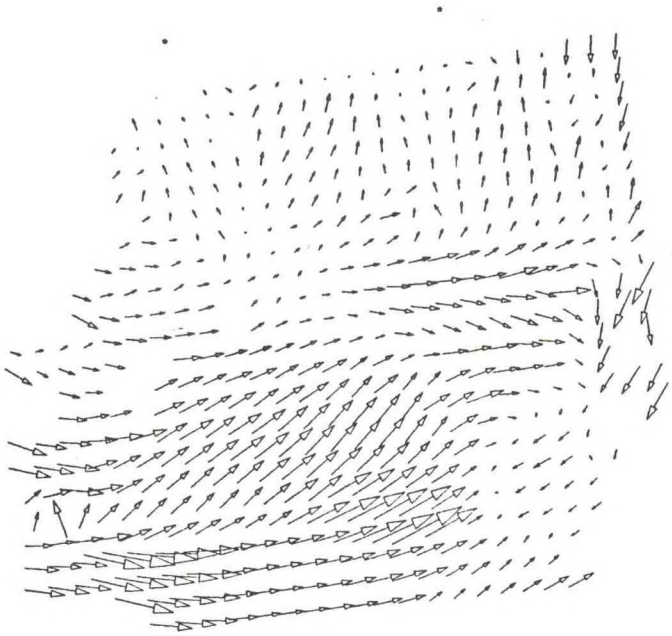

0740 16-OCT-82
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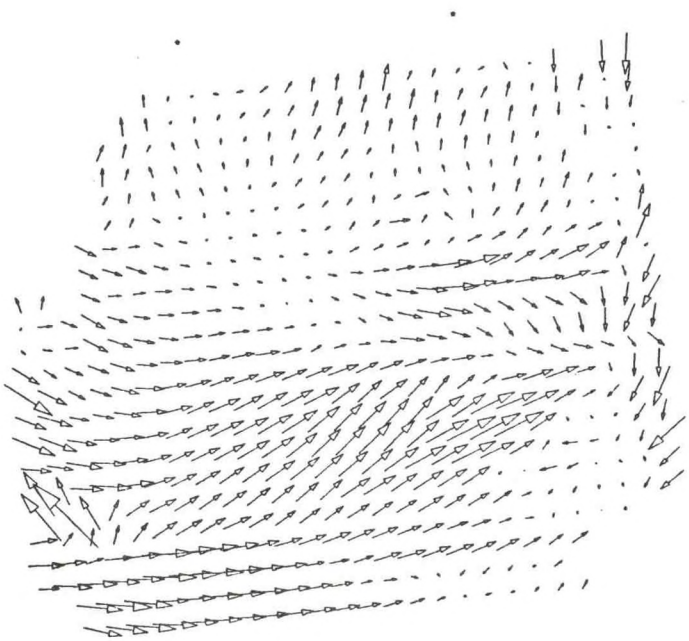

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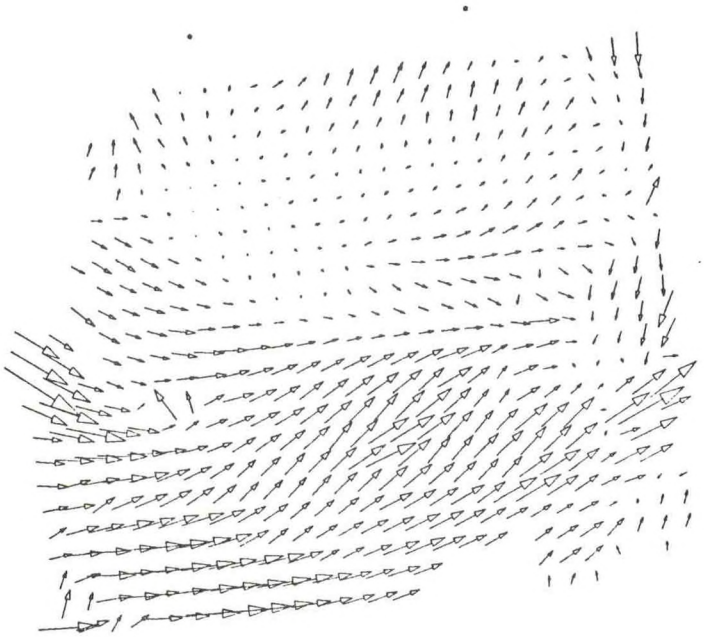

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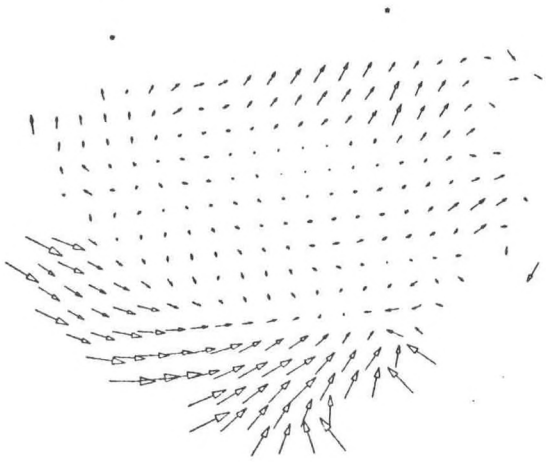
TRUE NORTH



1040 16-OCT-82
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8.0 KM , 200.0 CM/S

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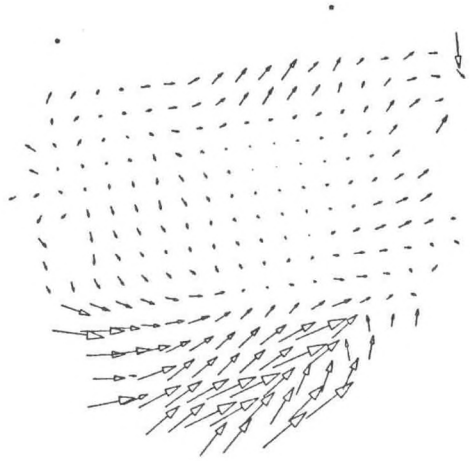

1140 16-OCT-82
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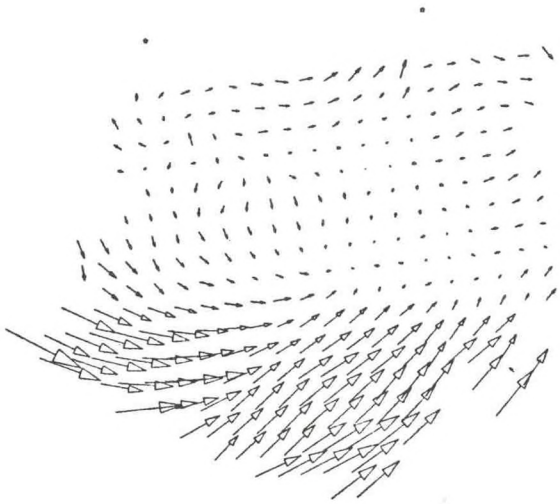

1240 16-OCT-82
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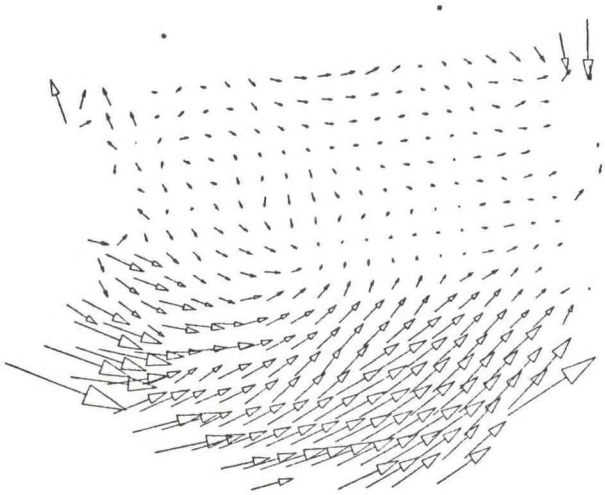

1340 16-OCT-82
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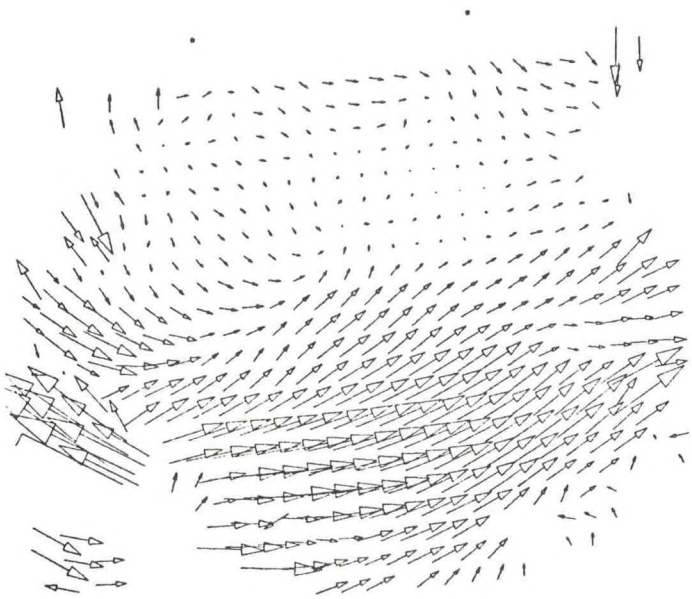
8.0 KM , 200.0 CM/S

TRUE NORTH



1440 16-OCT-82
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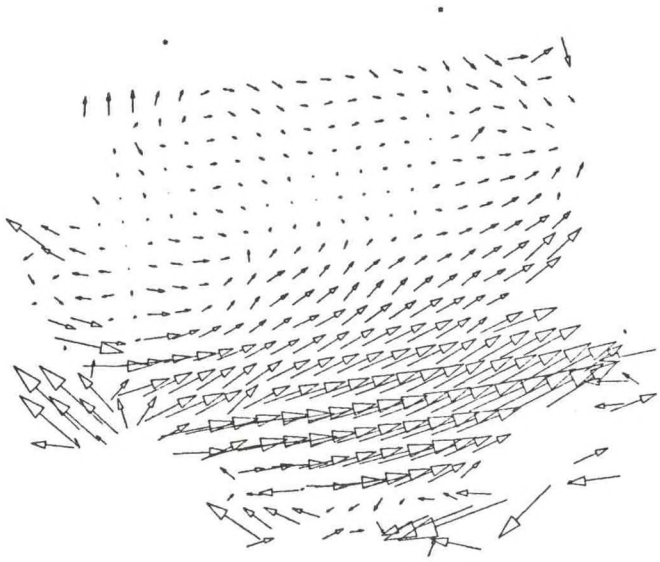
8.0 KM , 200.0 CM/S

TRUE NORTH



1540 16-OCT-82
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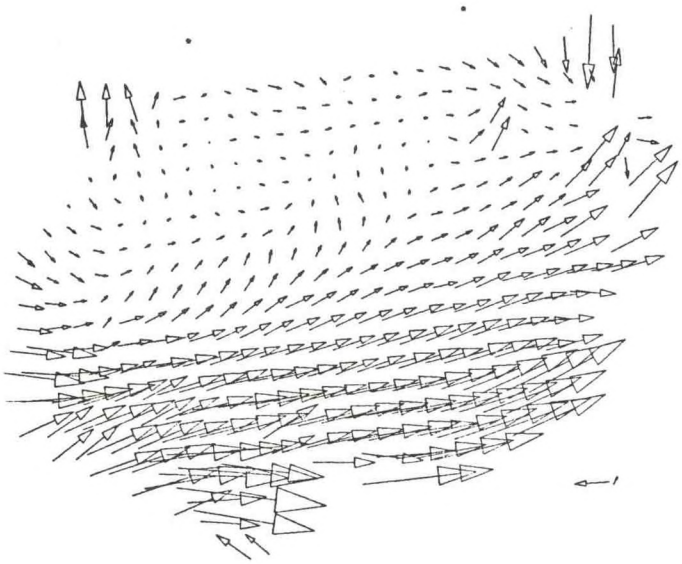
8.0 KM , 200.0 CM/S

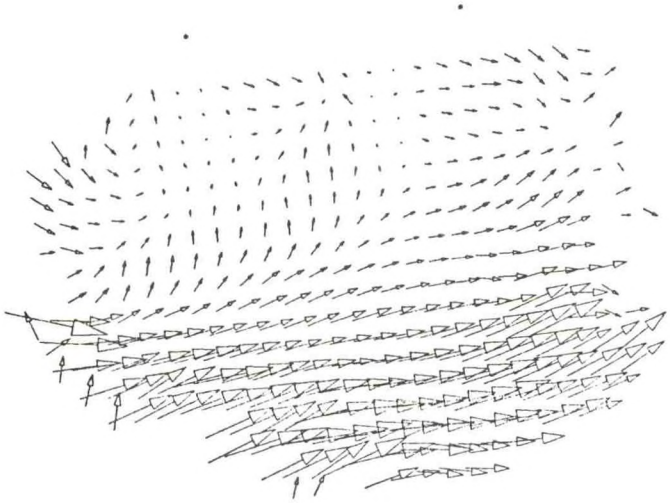
TRUE NORTH



1640 16-OCT-82
1650 16-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1740 16-OCT-82
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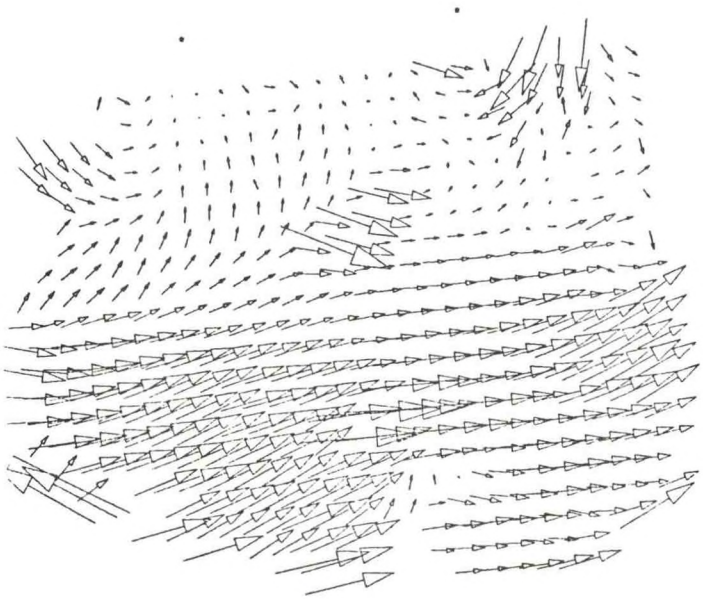
TRUE NORTH



1840 16-OCT-82
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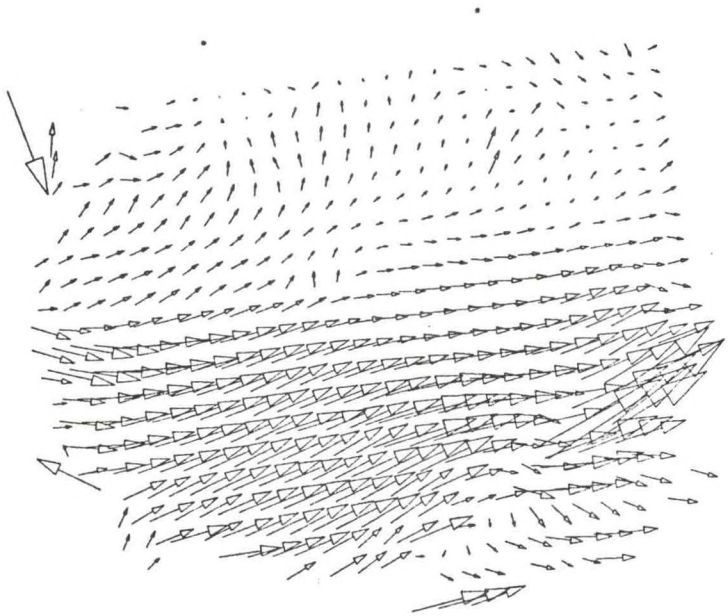
8.0 KM , 200.0 CM/S

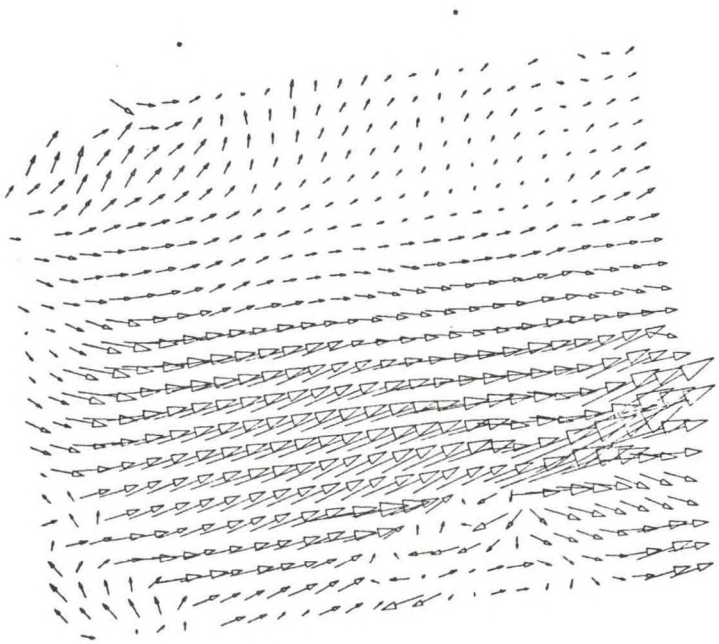
TRUE NORTH



1940 16-OCT-82
1950 16-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



2040 16-OCT-82
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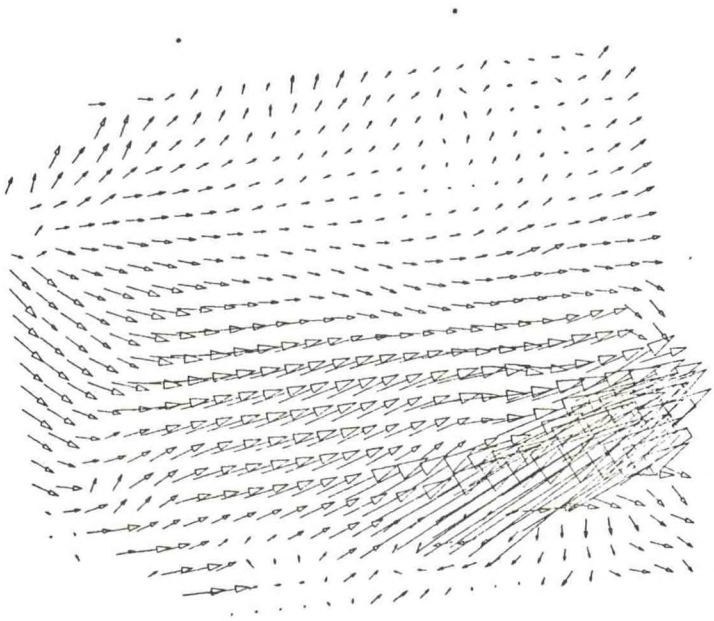
8.0 KM , 200.0 CM/S

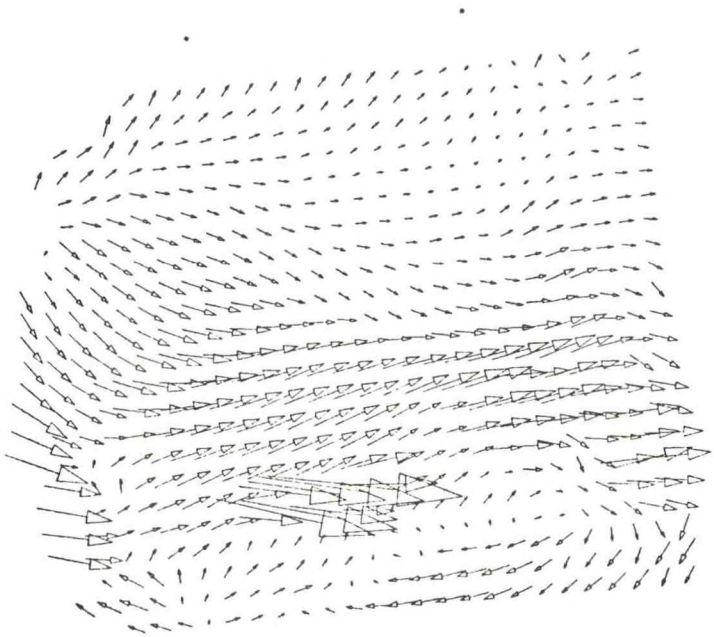
TRUE NORTH



2140 16-OCT-82
2150 16-OCT-82

8.0 KM , 200.0 CM/S

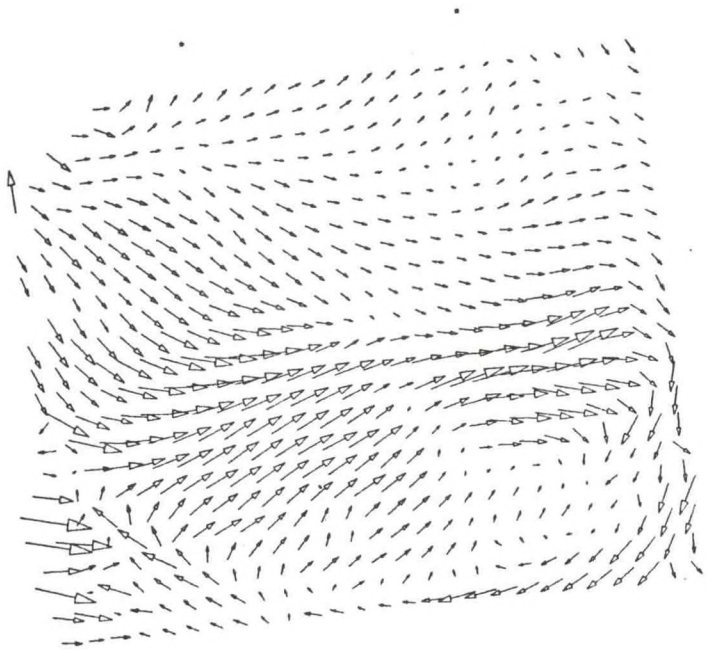
TRUE NORTH



2240 16-OCT-82
2250 16-OCT-82

8.0 KM , 200.0 CM/S

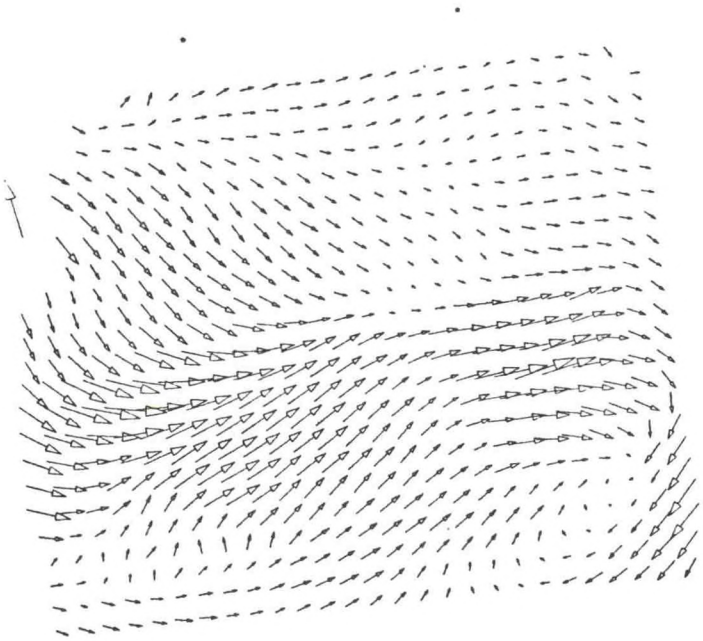
TRUE NORTH



2340 16-OCT-82
2350 16-OCT-82

8.0 KM , 200.0 CM/S

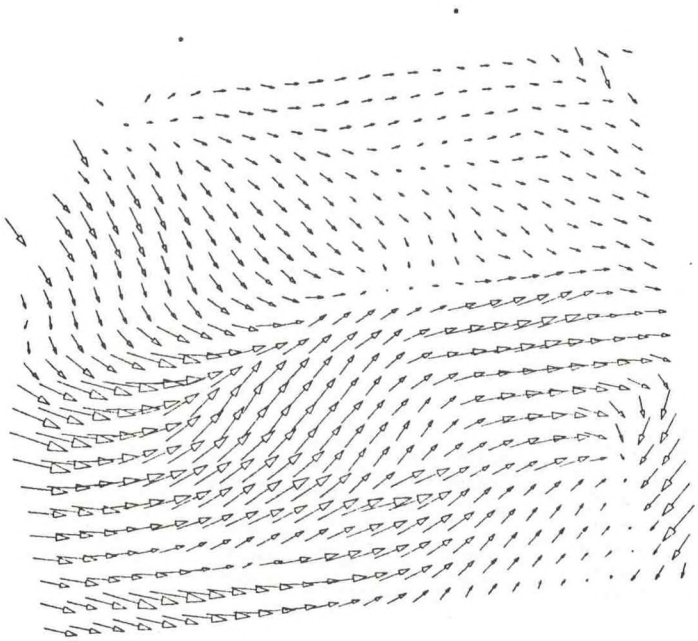
TRUE NORTH



0040 17-OCT-82
0050 17-OCT-82

8.0 KM , 200.0 CM/S

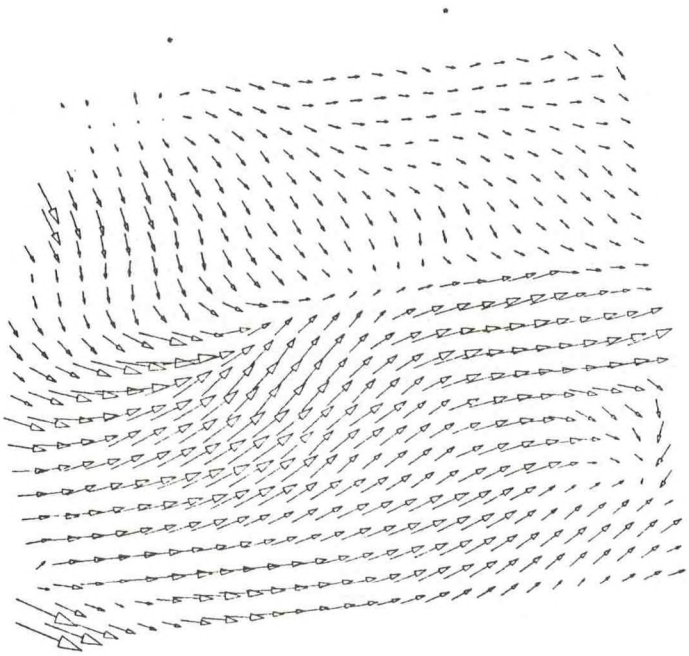
TRUE NORTH



0140 17-OCT-82
0150 17-OCT-82

8.0 KM , 200.0 CM/S

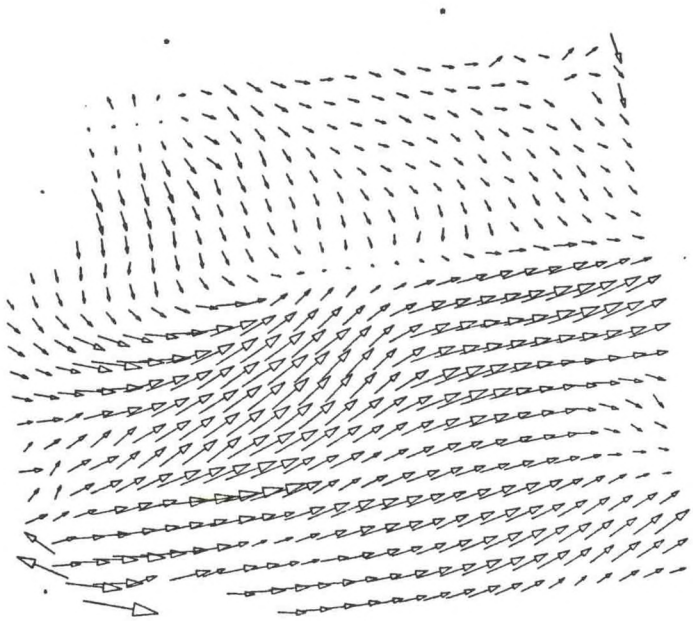
TRUE NORTH



0240 17-OCT-82
0250 17-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0340 17-OCT-82
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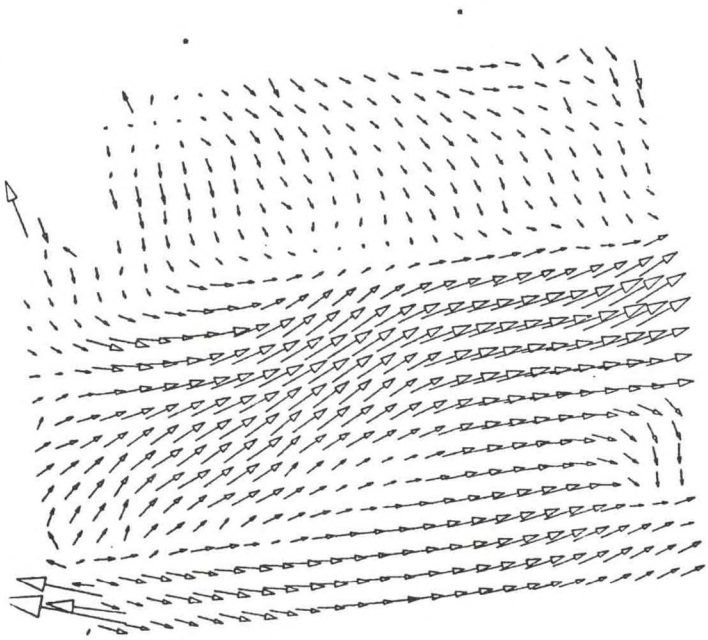

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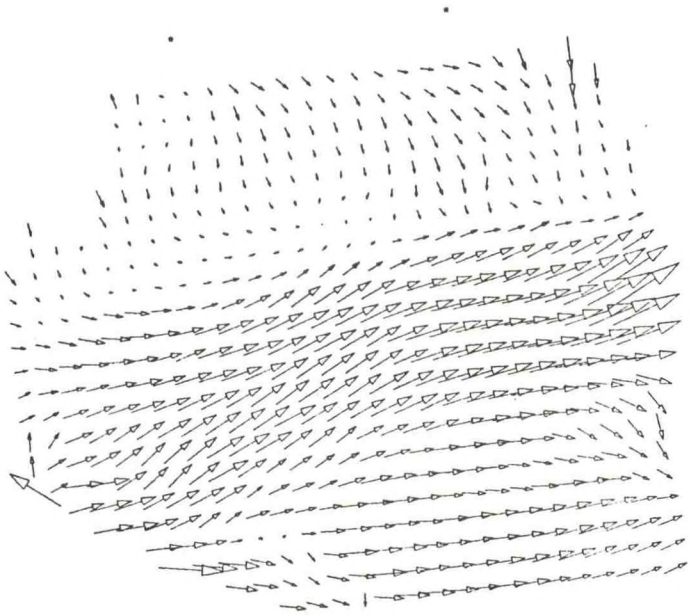

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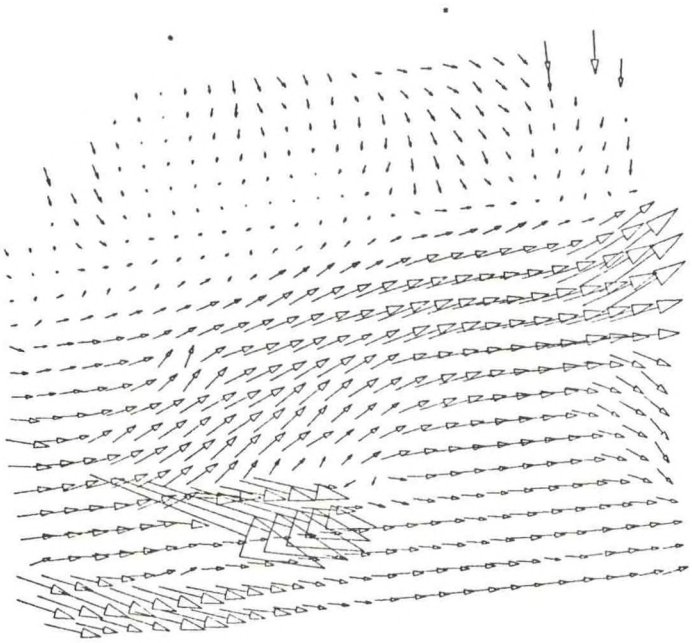

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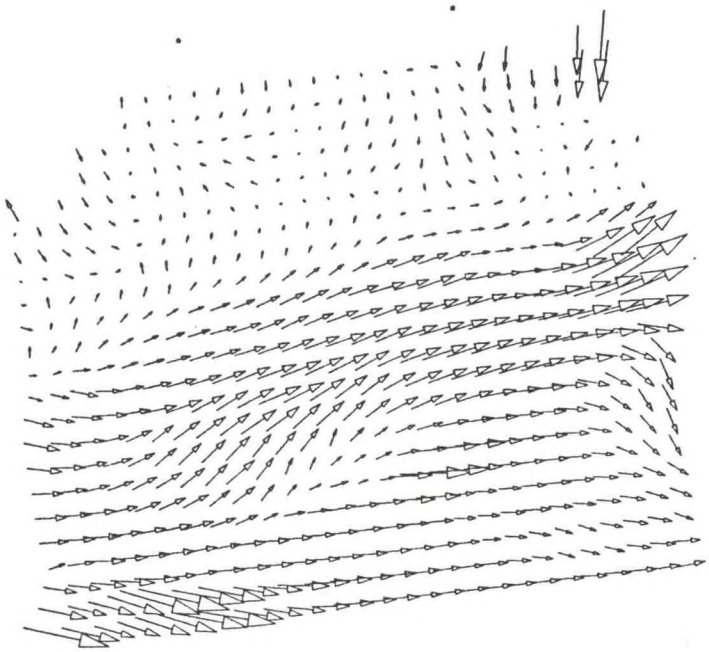

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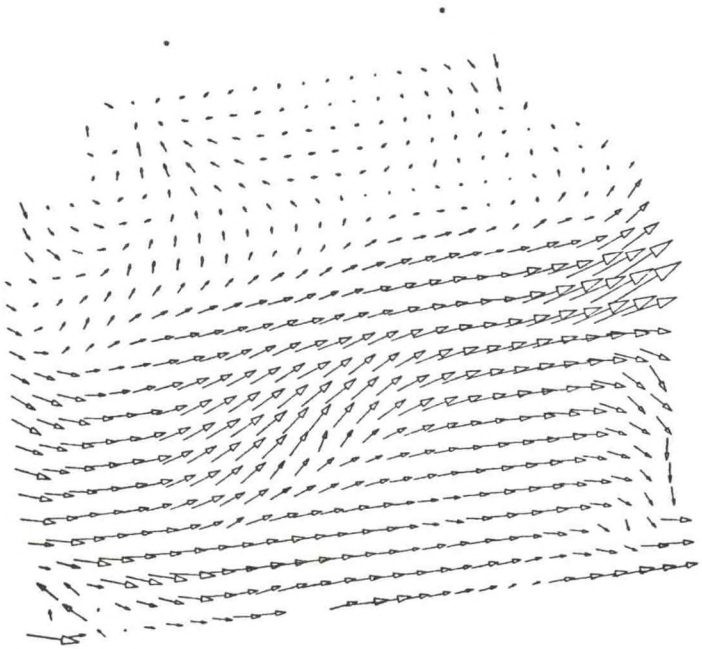

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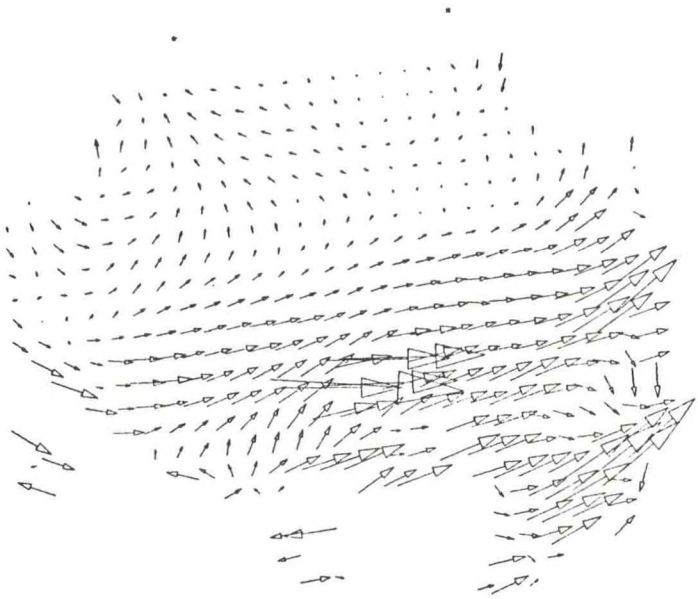

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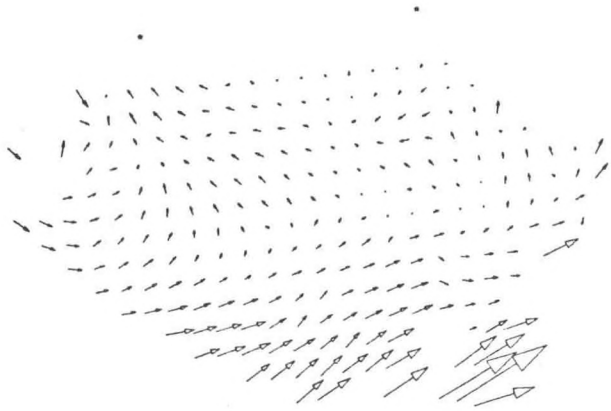

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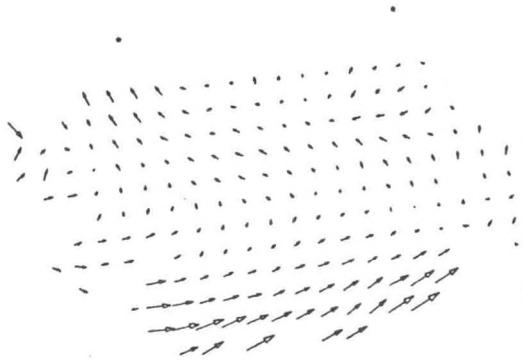

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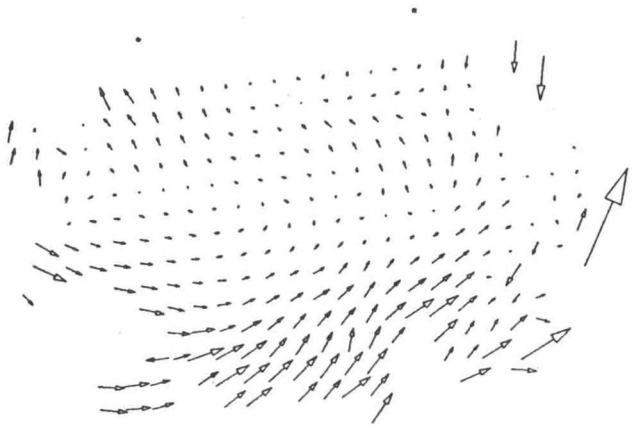

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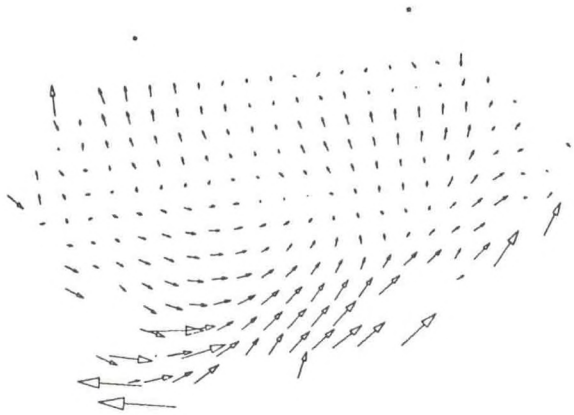

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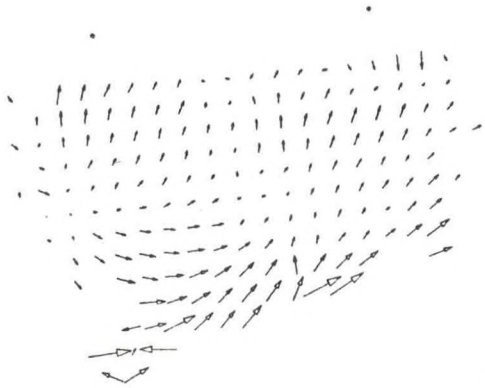

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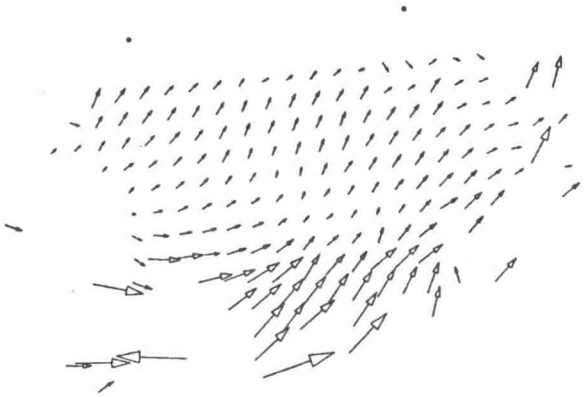

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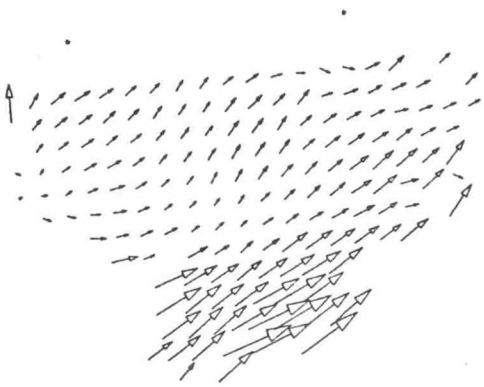

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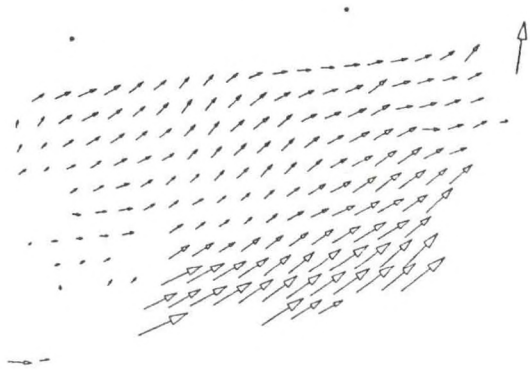

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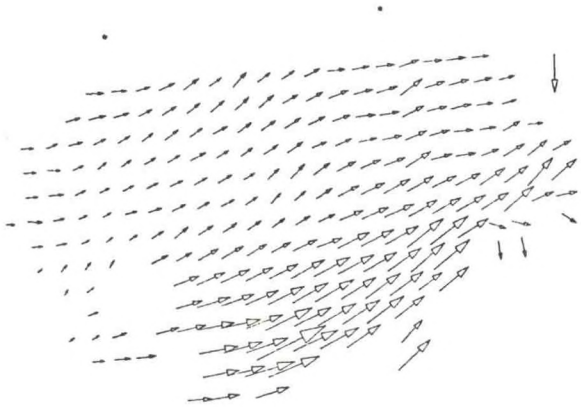

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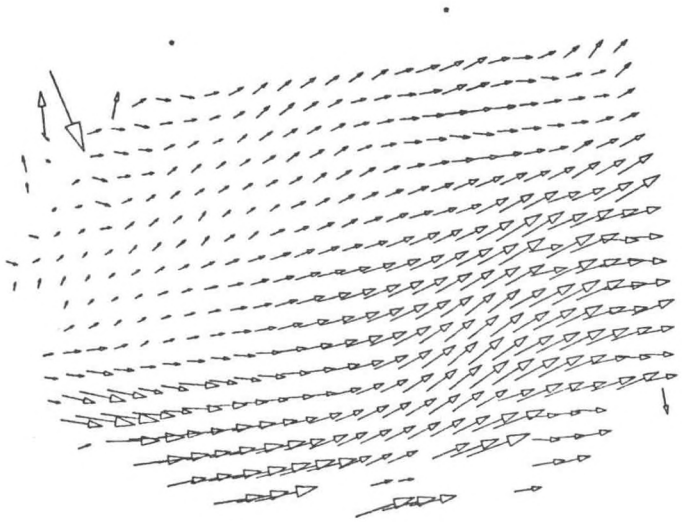

1940 17-OCT-82
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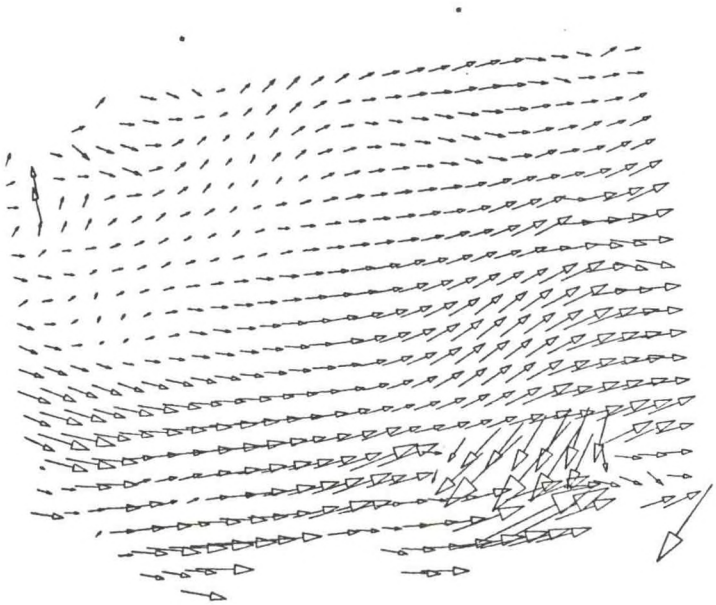

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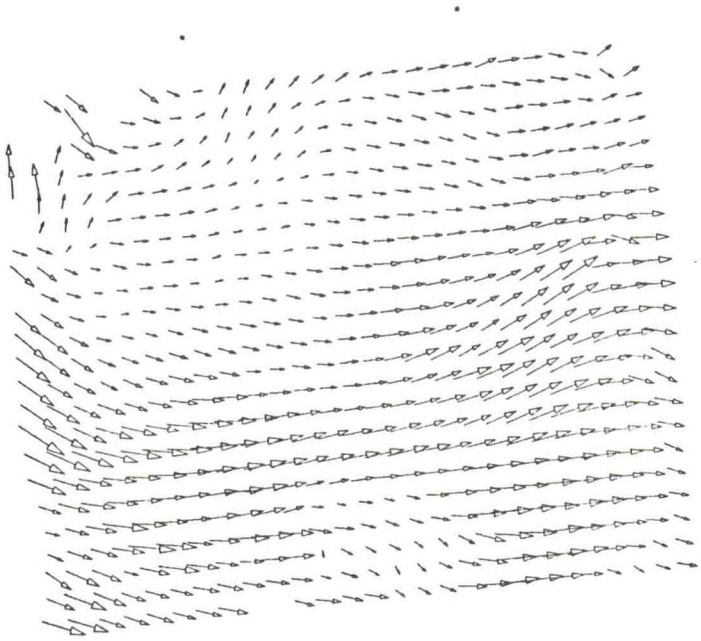

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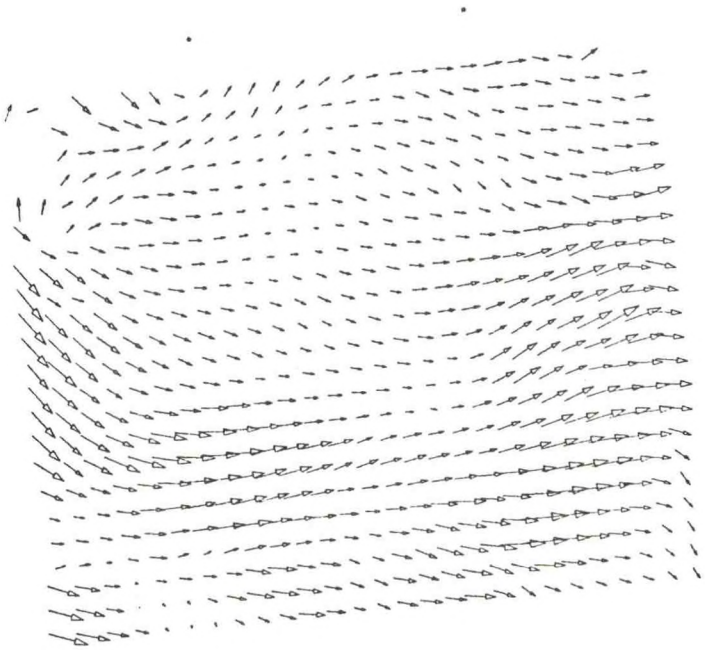

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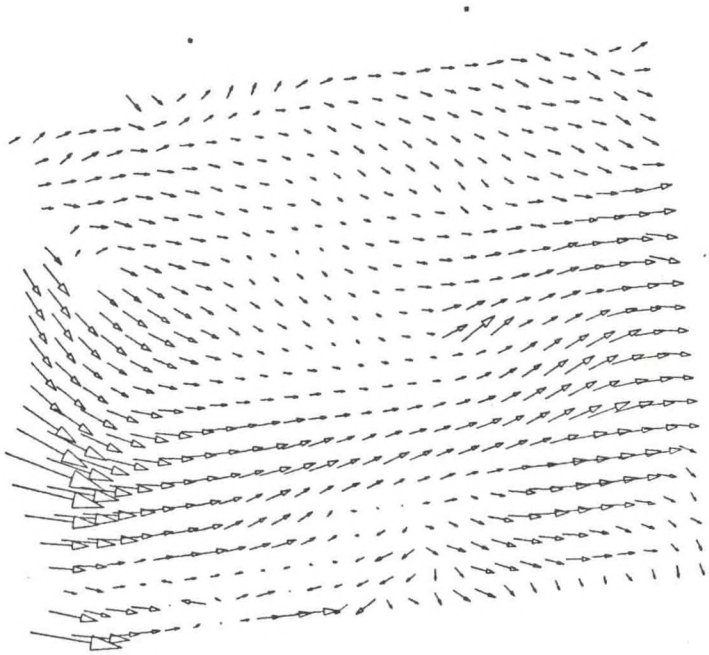

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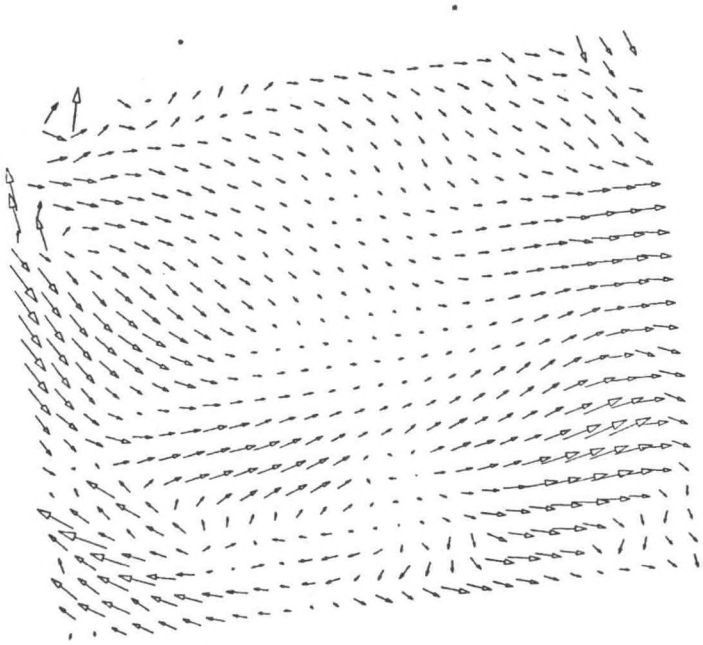

0040 18-OCT-82
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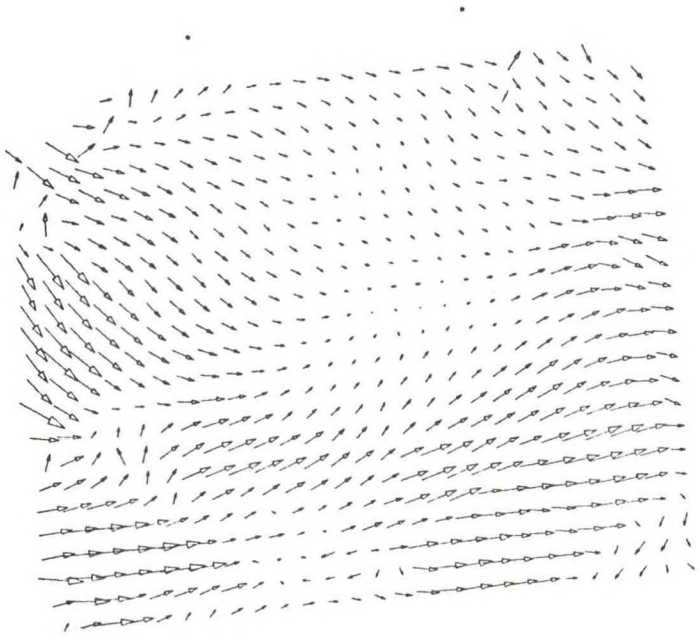

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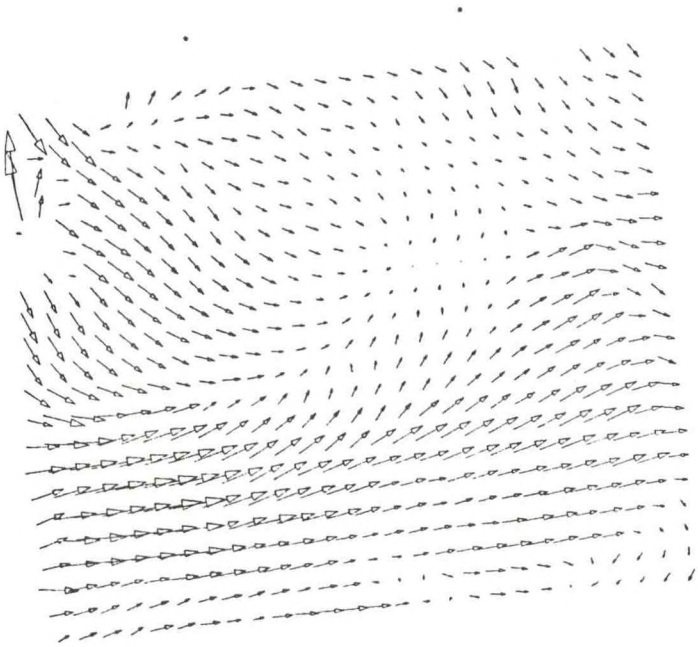

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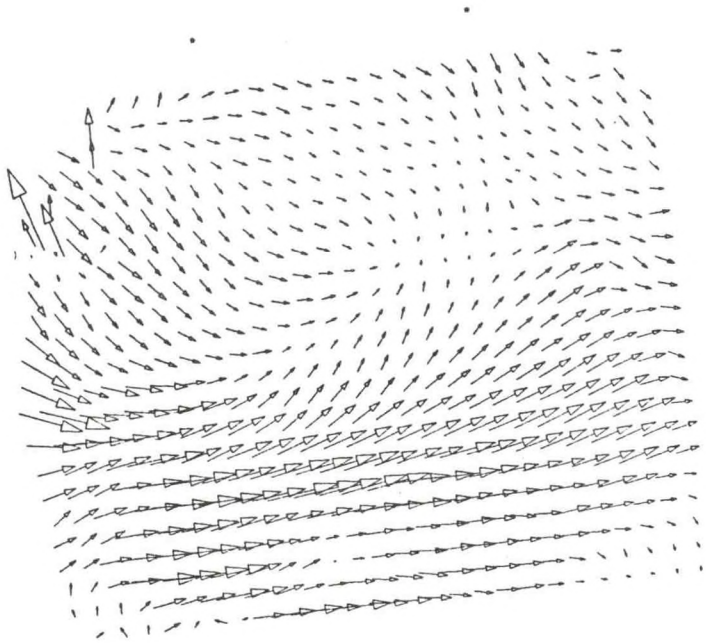

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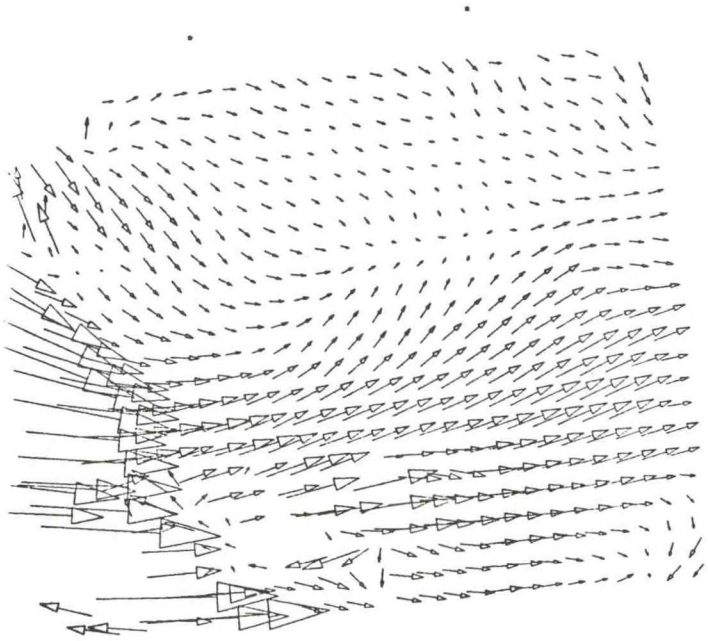

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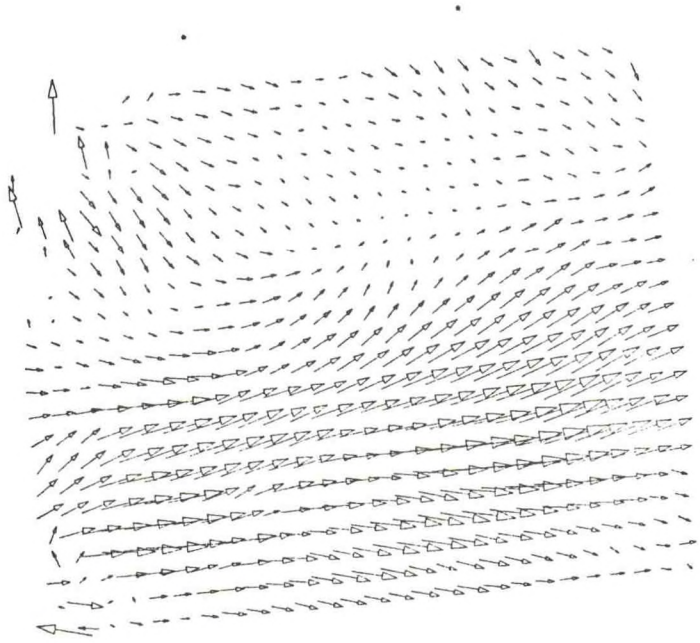

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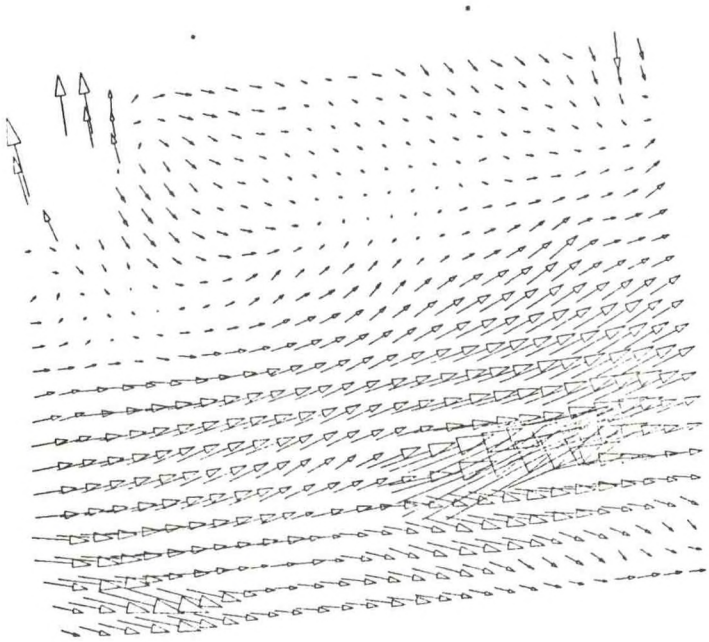

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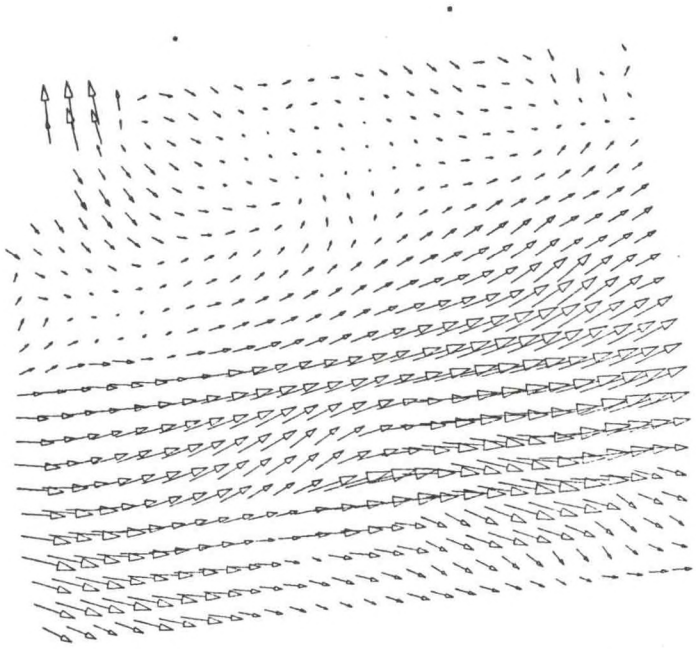

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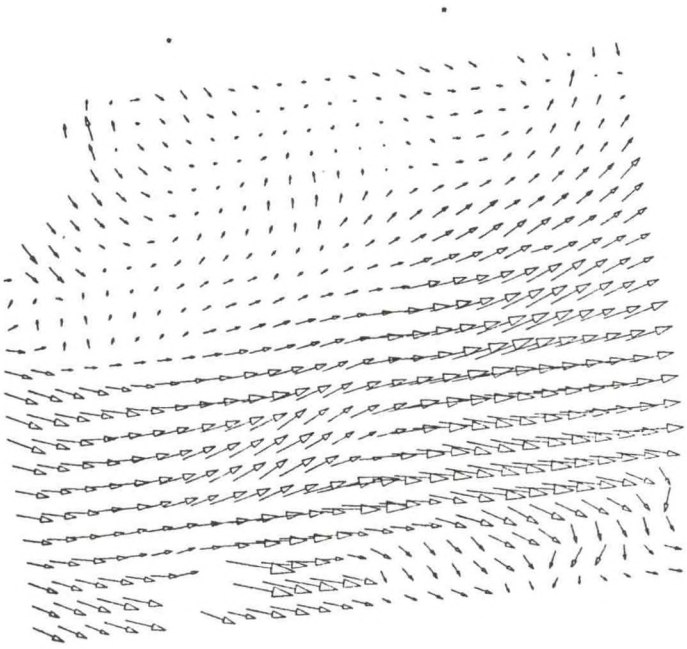

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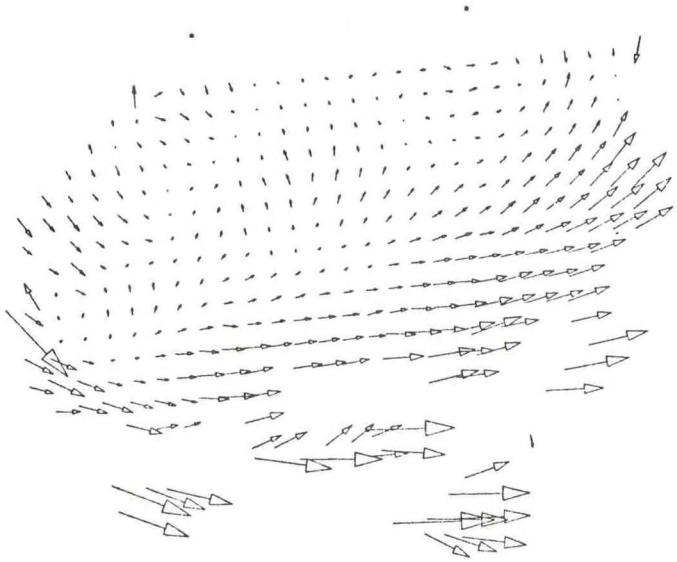

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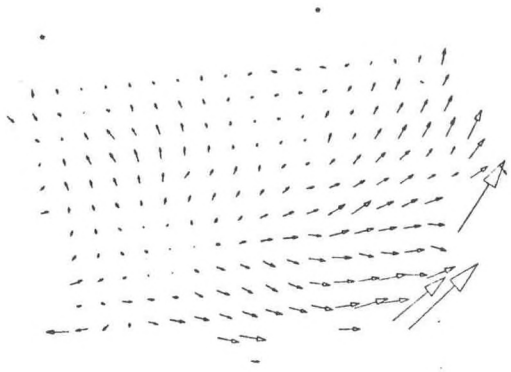

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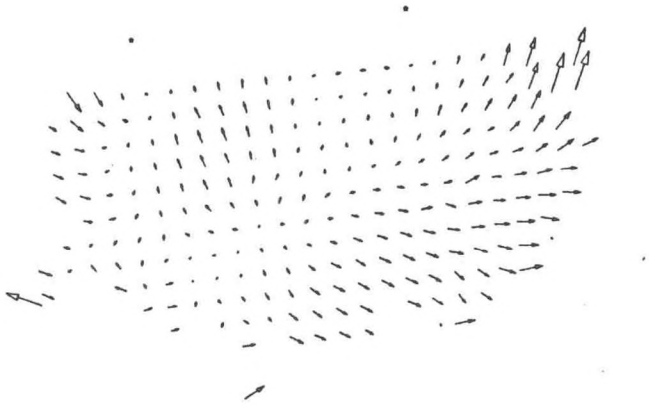

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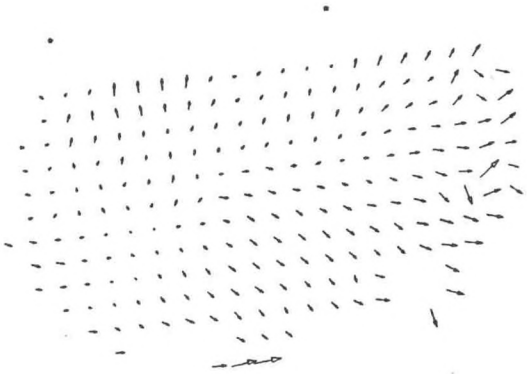

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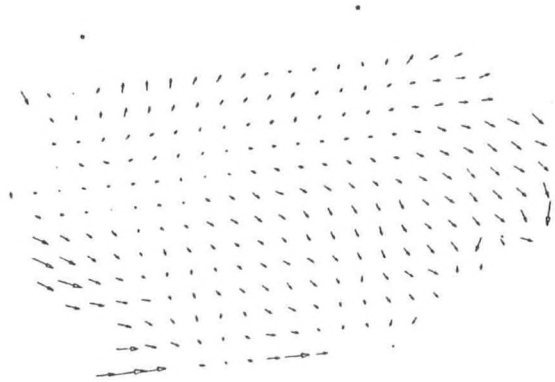

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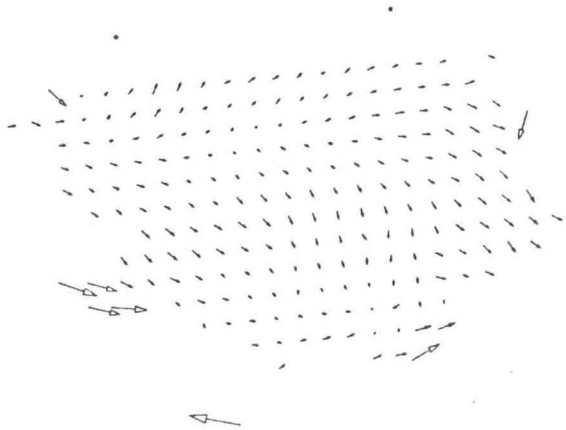

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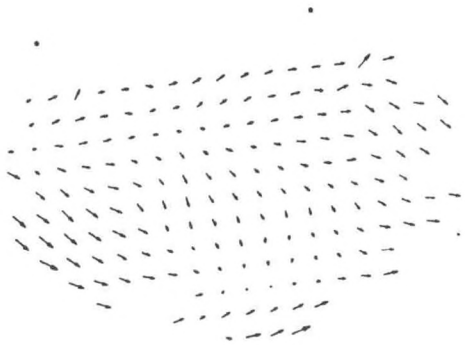

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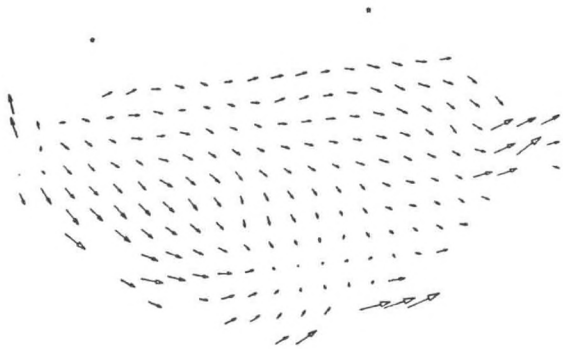

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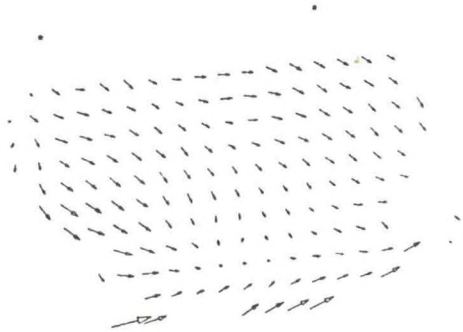

1740 18-OCT-82
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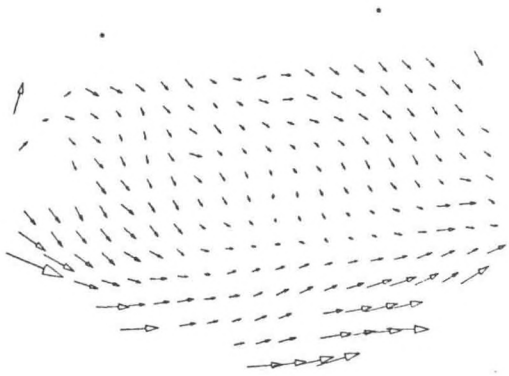

1840 18-OCT-82
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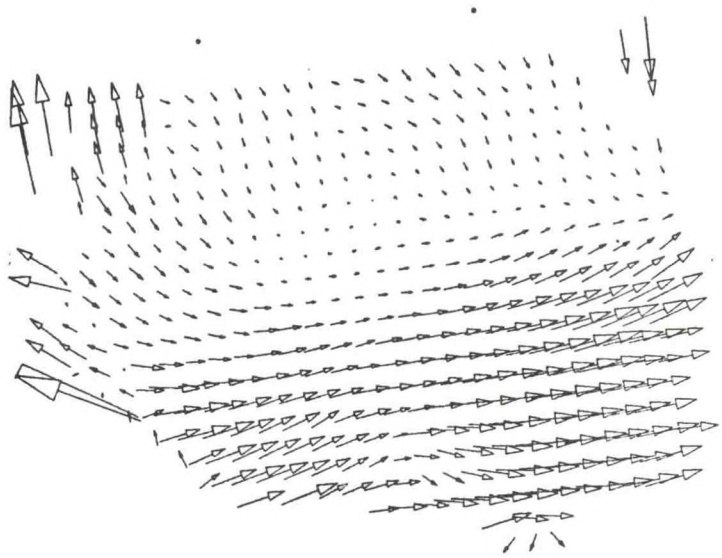

1940 18-OCT-82
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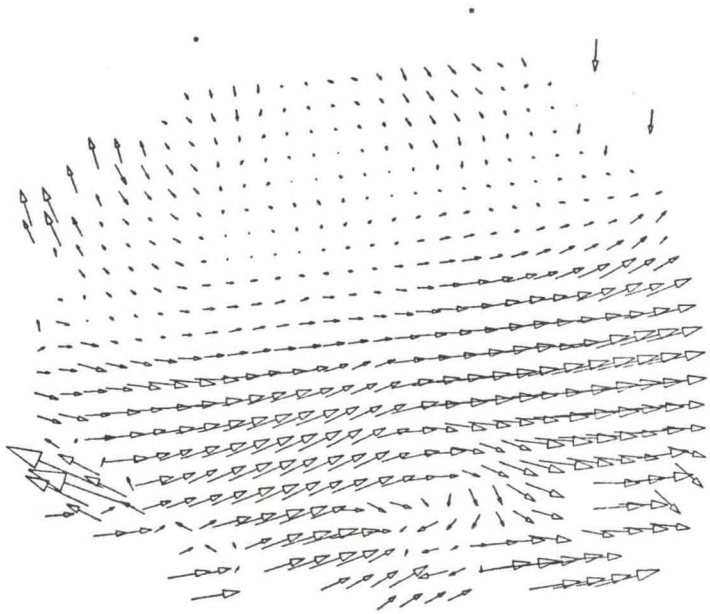

2040 18-OCT-82
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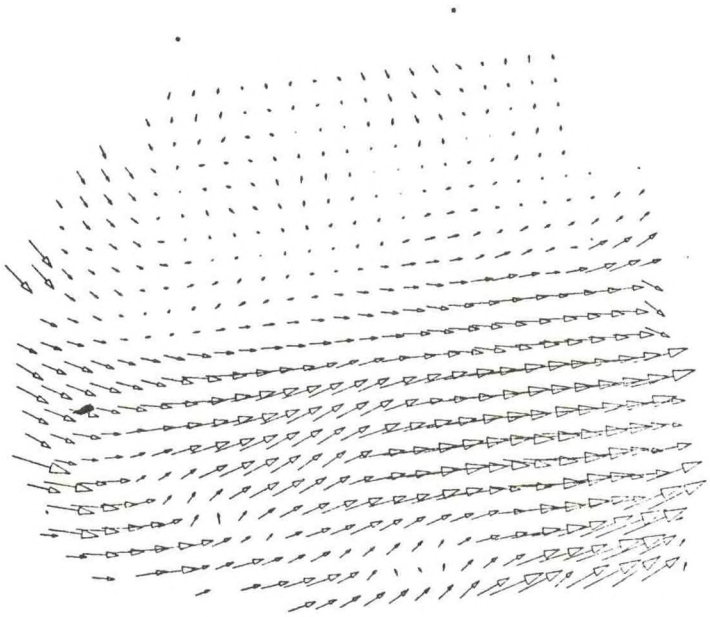
TRUE NORTH



2140 18-OCT-82
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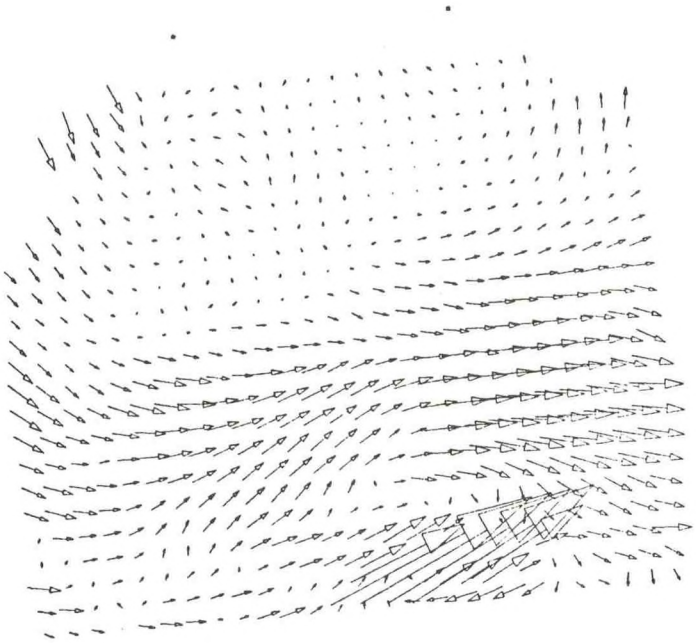

2240 18-OCT-82
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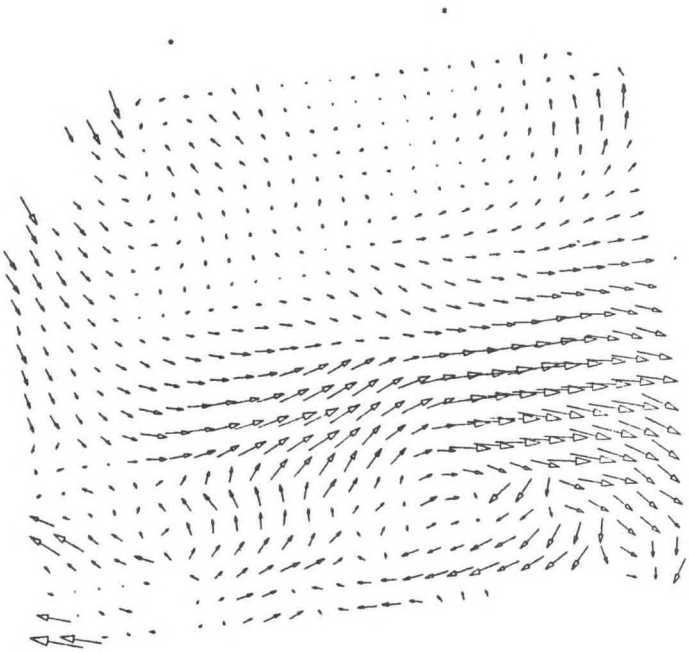

2340 18-OCT-82
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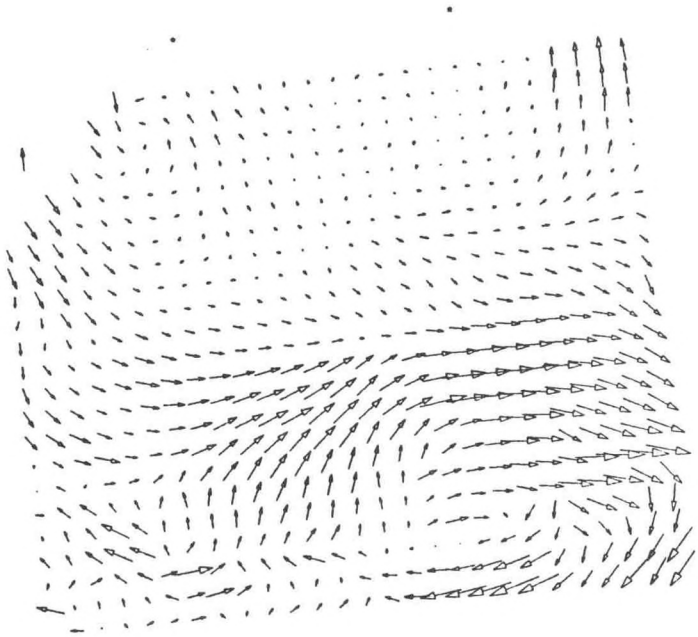
8.0 KM , 200.0 CM/S

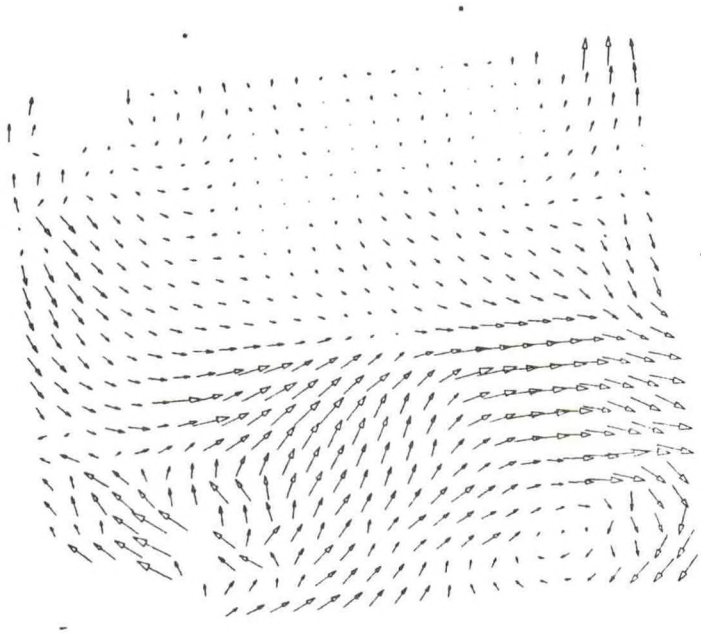
TRUE NORTH



0040 19-OCT-82
0050 19-OCT-82

8.0 KM . 200.0 CM/S

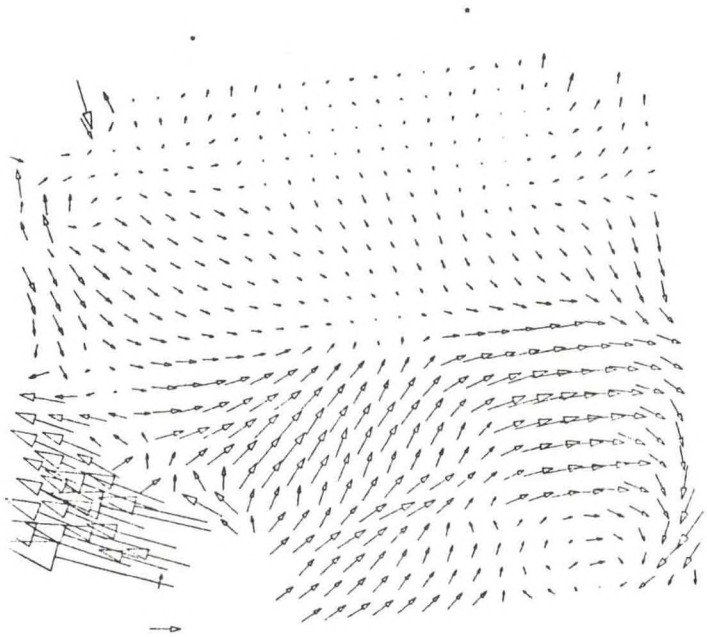
TRUE NORTH



0140 19-OCT-82
0150 19-OCT-82

8.0 KM . 200.0 CM/S

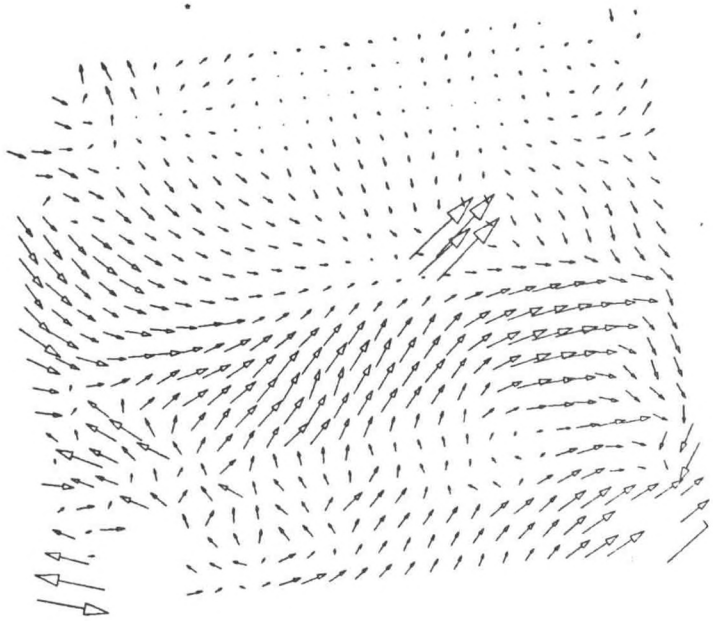
TRUE NORTH



0240 19-OCT-82
0250 19-OCT-82

8.0 KM , 200.0 CM/S

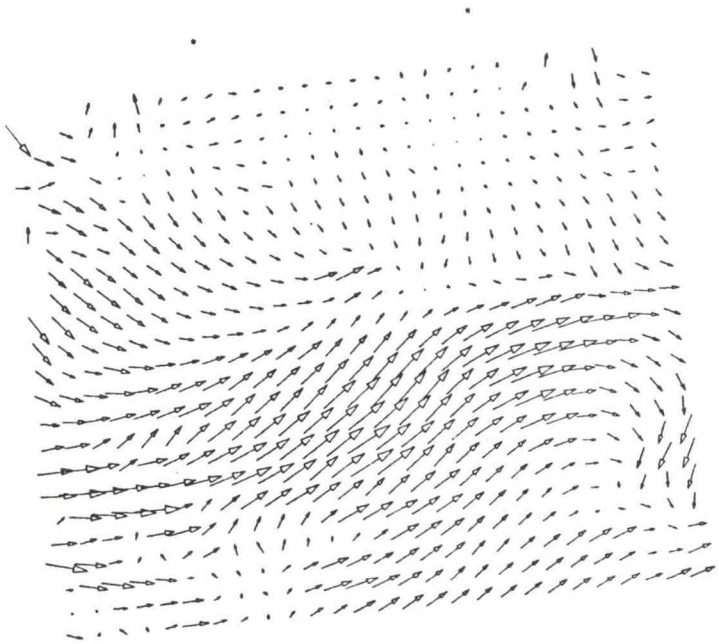
TRUE NORTH ↑



0340 19-OCT-82
0350 19-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑



0440 19-OCT-82
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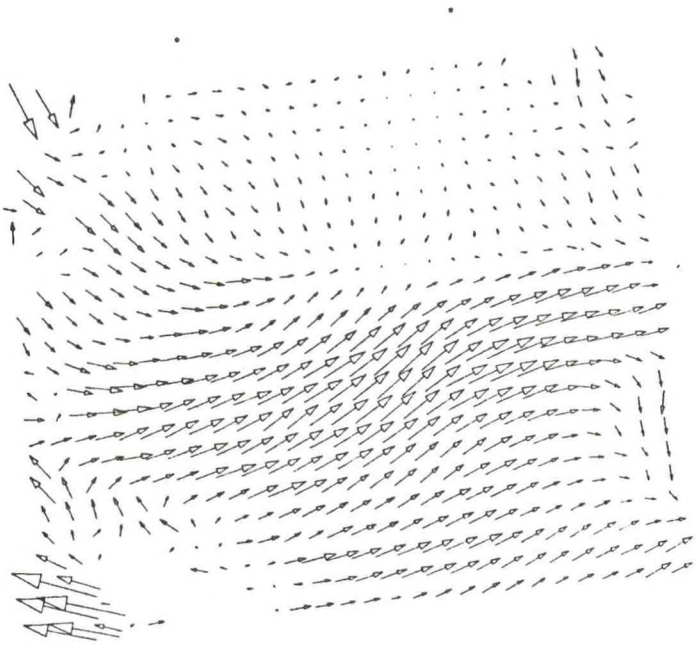

0540 19-OCT-82
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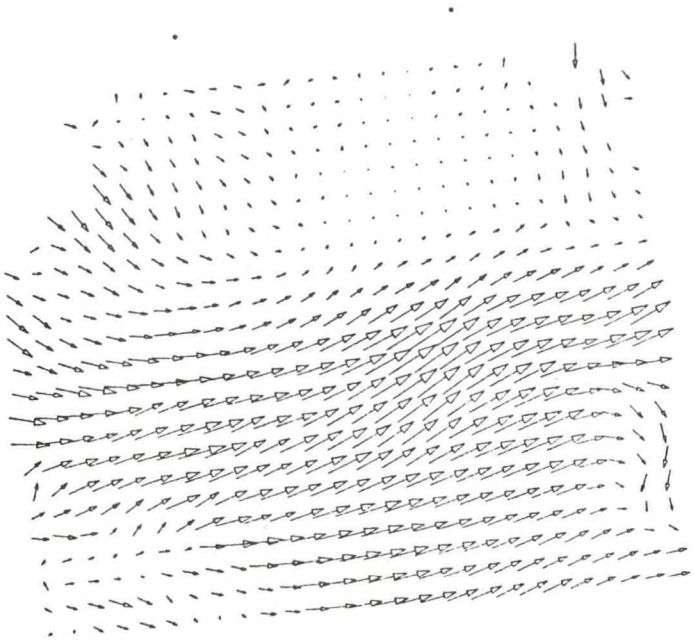
8.0 KM , 200.0 CM/S

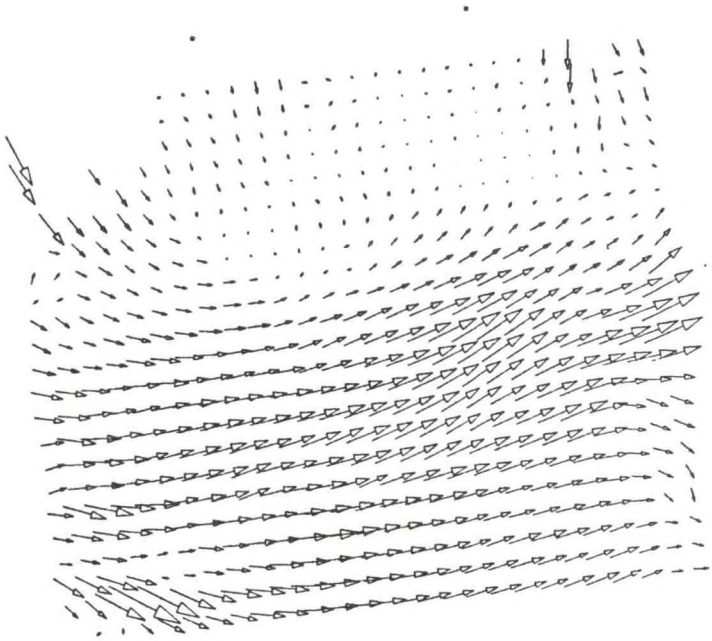
TRUE NORTH



0640 19-OCT-82
0650 19-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0740 19-OCT-82
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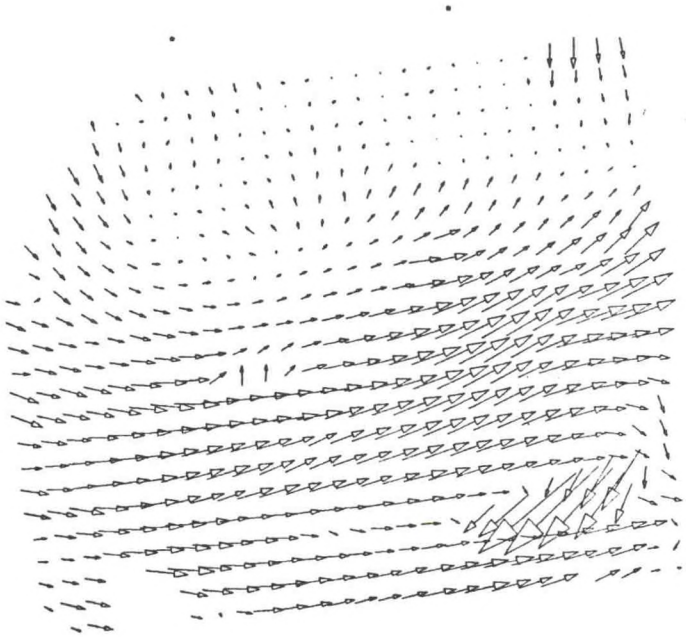

0840 19-OCT-82
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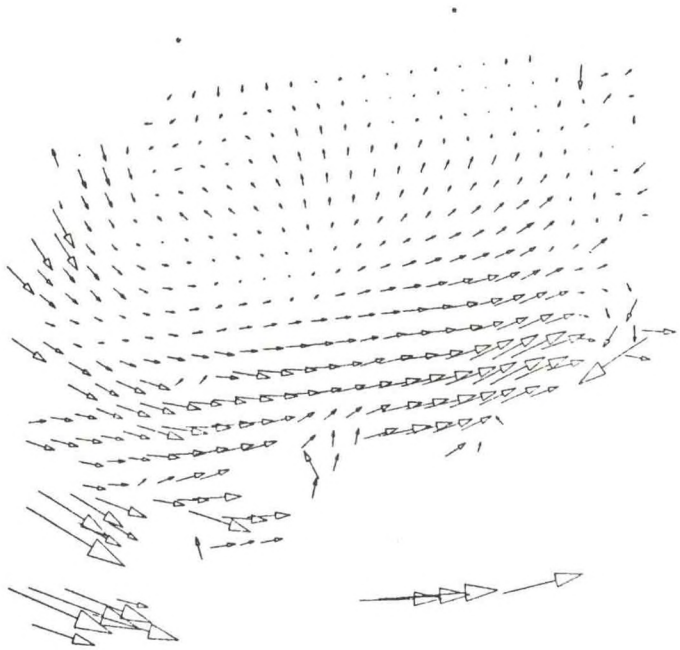
8.0 KM , 200.0 CM/S

TRUE NORTH



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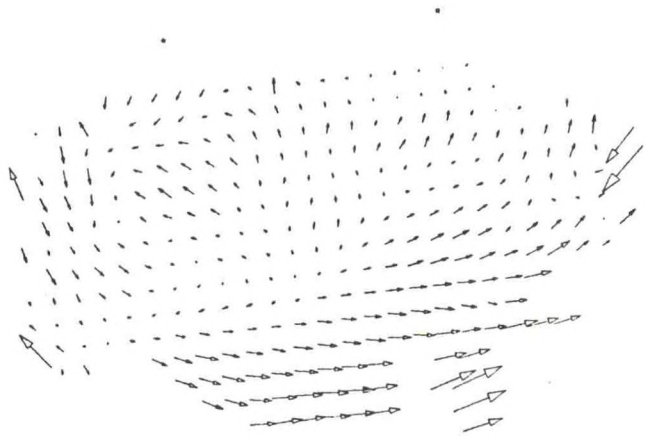
TRUE NORTH



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8.0 KM , 200.0 CM/S

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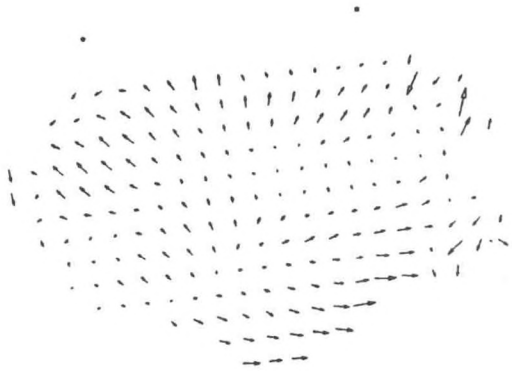

1140 19-OCT-82
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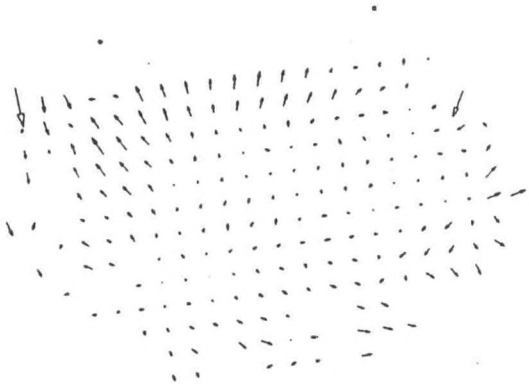
8.0 KM , 200.0 CM/S

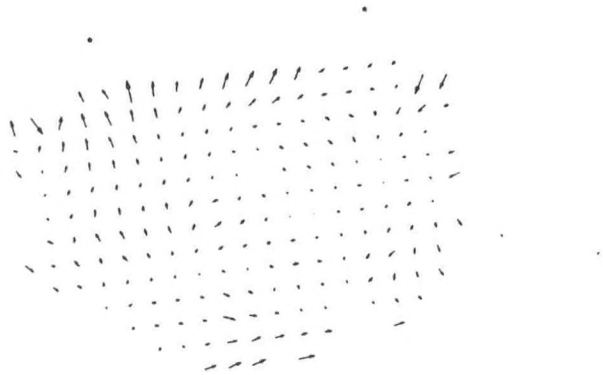
TRUE NORTH



1240 19-OCT-82
1250 19-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



1340 19-OCT-82
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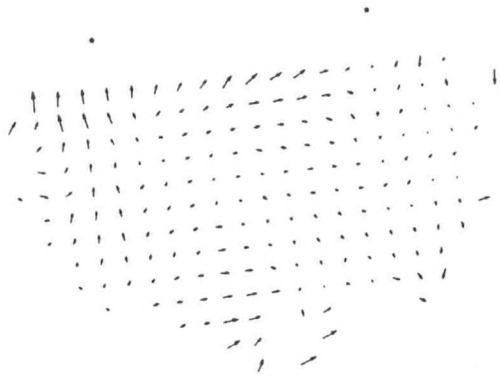
8.0 KM , 200.0 CM/S

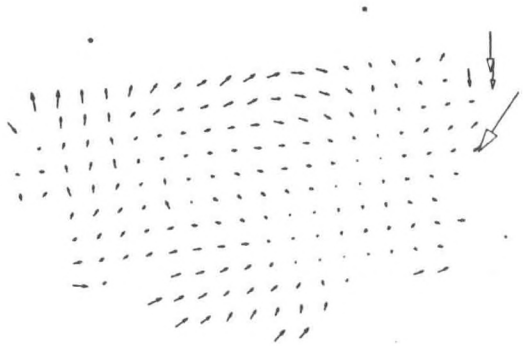
TRUE NORTH



1440 19-OCT-82
1450 19-OCT-82

8.0 KM . 200.0 CM/S

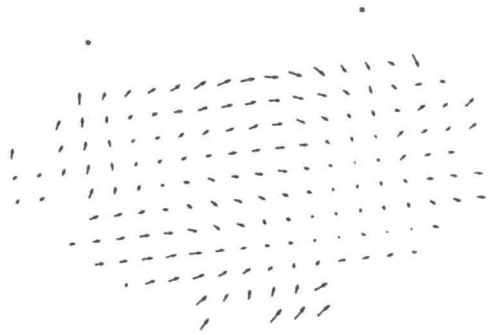
TRUE NORTH



1540 19-OCT-82
1550 19-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



1640 19-OCT-82
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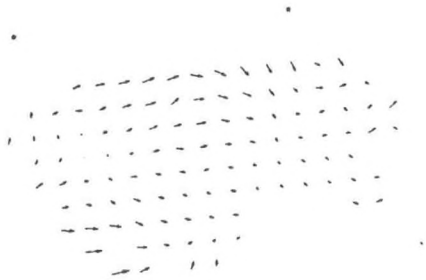
8.0 KM , 200.0 CM/S

TRUE NORTH



1740 19-OCT-82
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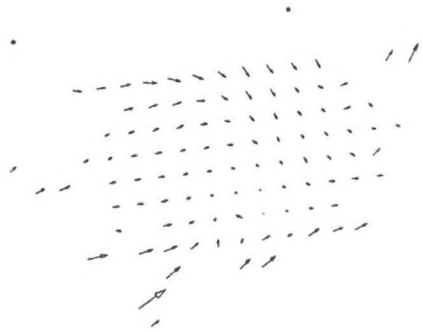
8.0 KM , 200.0 CM/S

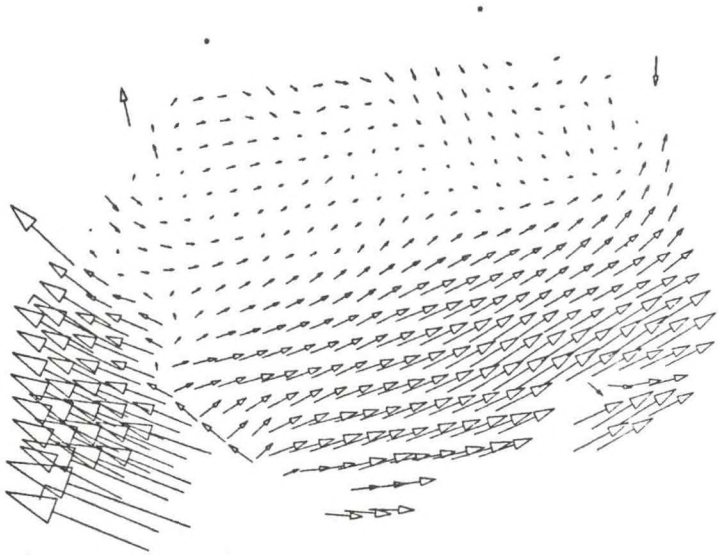
TRUE NORTH



1840 19-OCT-82
1850 19-OCT-82

8.0 KM , 200.0 CM/S

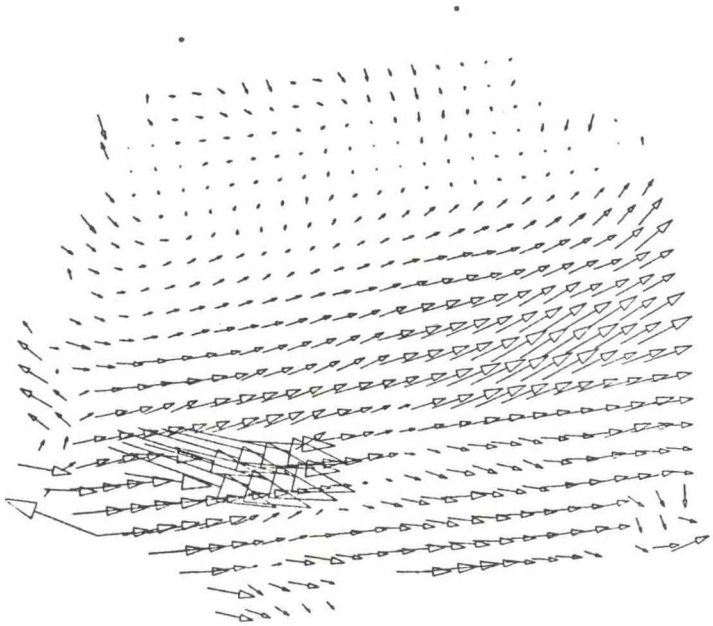
TRUE NORTH



1940 19-OCT-82
1950 19-OCT-82

8.0 KM , 200.0 CM/S

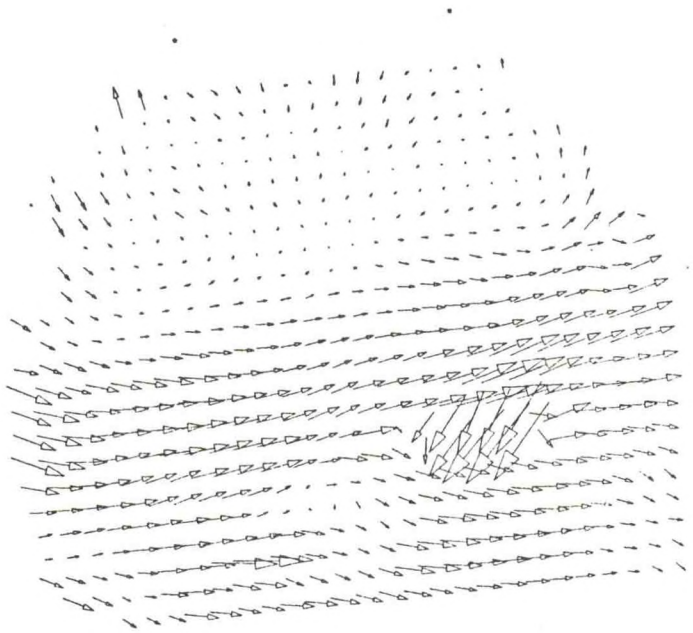
TRUE NORTH



2040 19-OCT-82
2050 19-OCT-82

8.0 KM , 200.0 CM/S

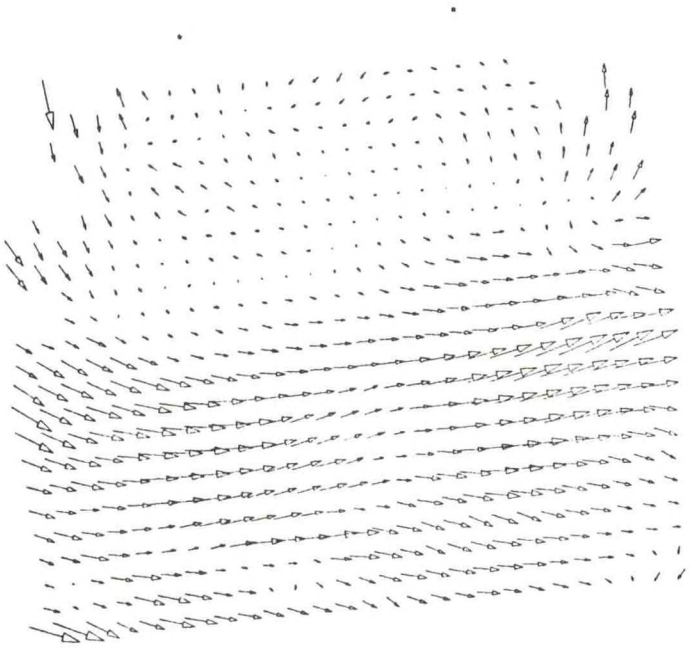
TRUE NORTH



2140 19-OCT-82
2150 19-OCT-82

8.0 KM , 200.0 CM/S

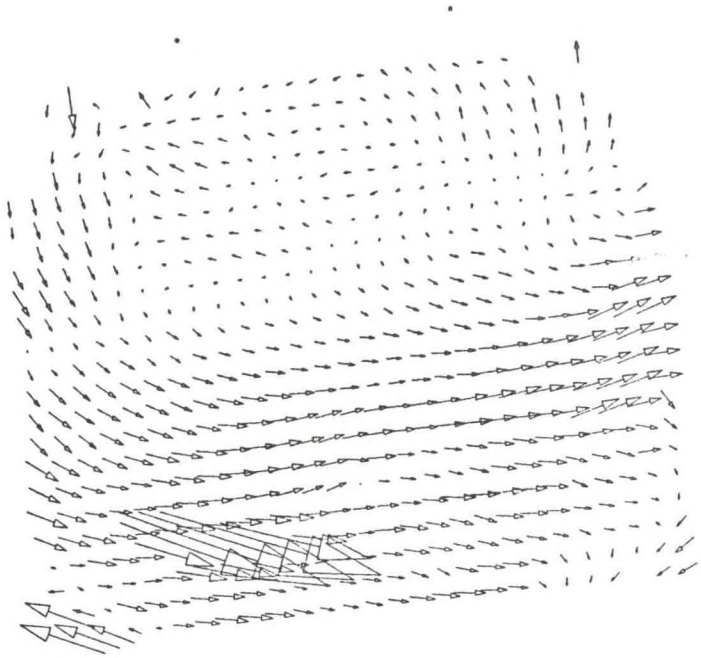
TRUE NORTH



2240 19-OCT-82
2250 19-OCT-82

8.0 KM . 200.0 CM/S

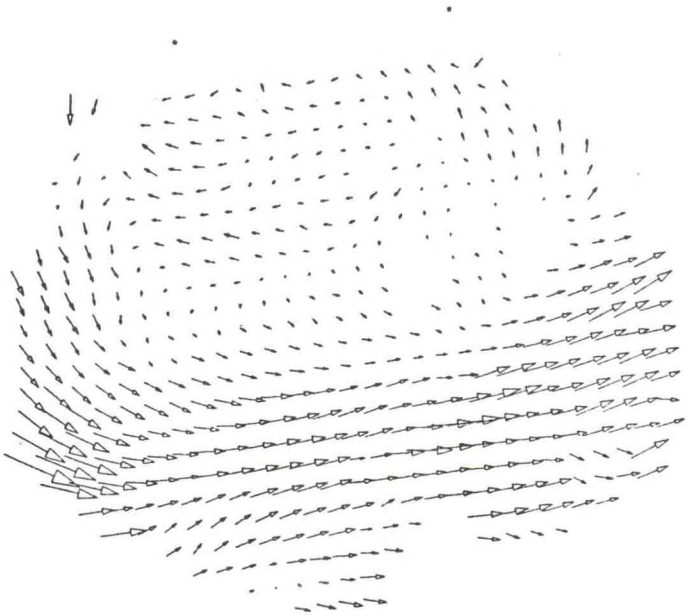
TRUE NORTH

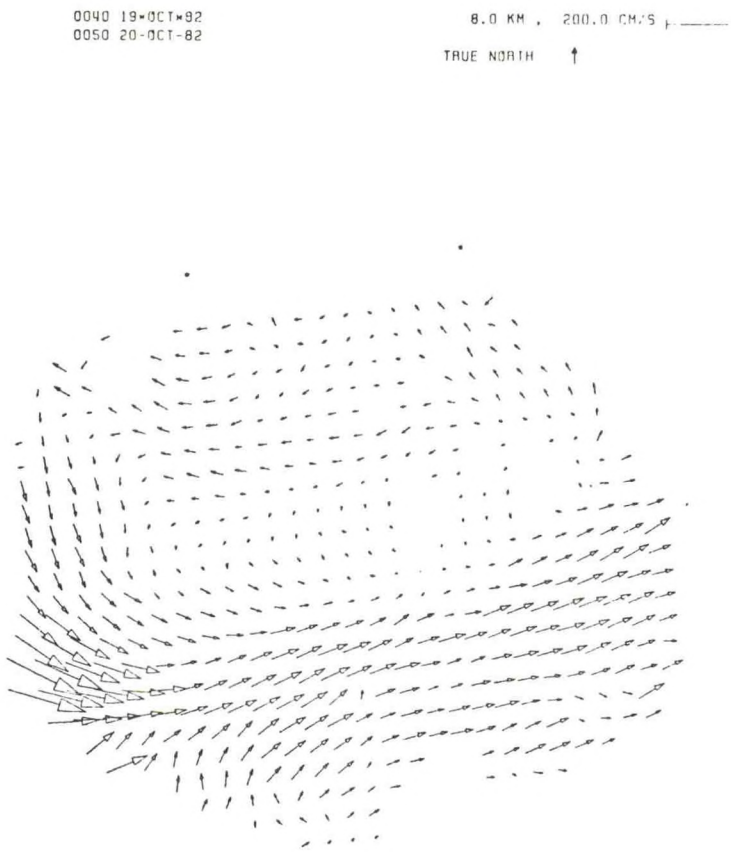


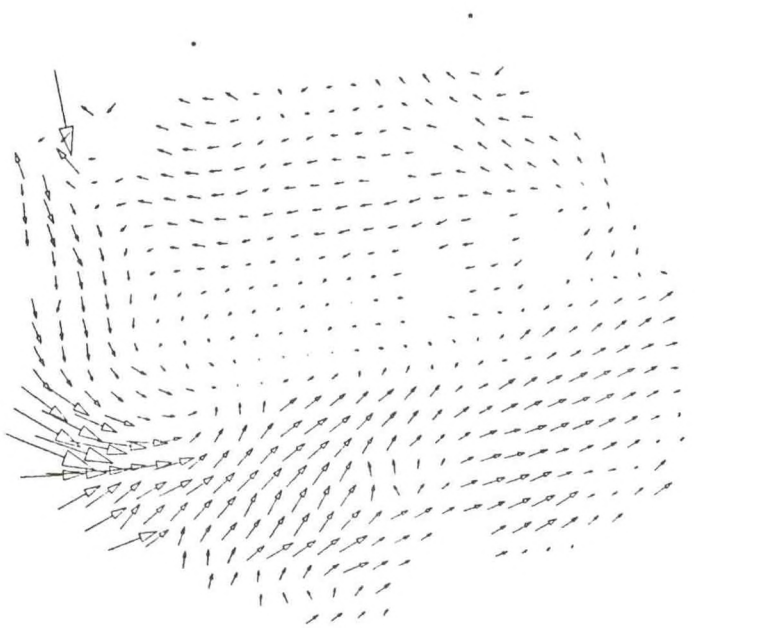
2340 19-OCT-82
2350 19-OCT-82

8.0 KM . 200.0 CM/S

TRUE NORTH



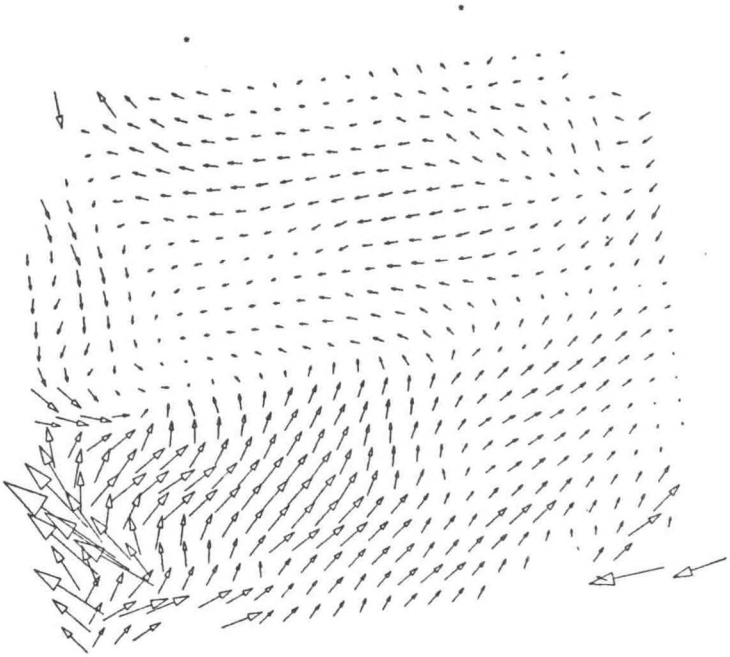

0040 19-OCT-92
0050 20-OCT-82
8.0 KM , 200.0 CM/S
TRUE NORTH


0140 19-OCT-82
0150 20-OCT-82
8.0 KM , 200.0 CM/S
TRUE NORTH

0240 20-OCT-82
0250 20-OCT-82

8.0 KM , 200.0 CM/S

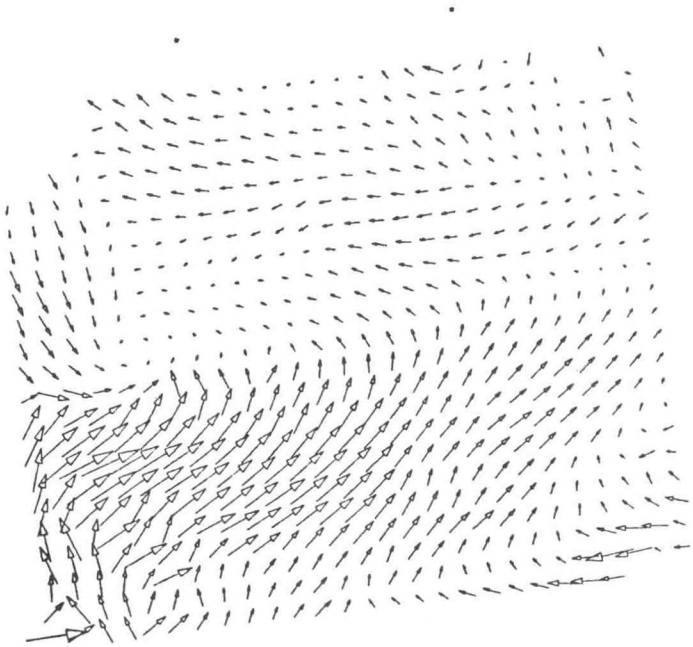
TRUE NORTH



0340 20-OCT-82
0350 20-OCT-82

8.0 KM , 200.0 CM/S

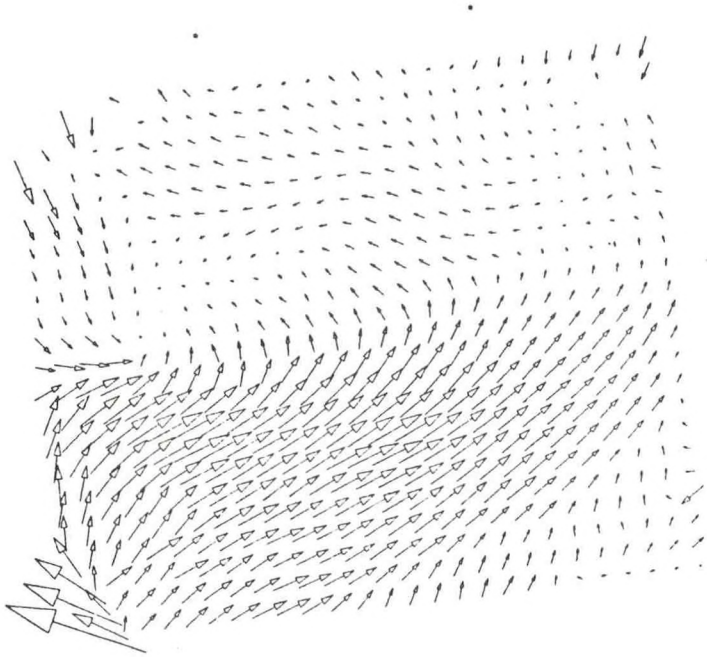
TRUE NORTH



0440 20-OCT-82
0450 20-OCT-82

8.0 KM , 200.0 CM/S

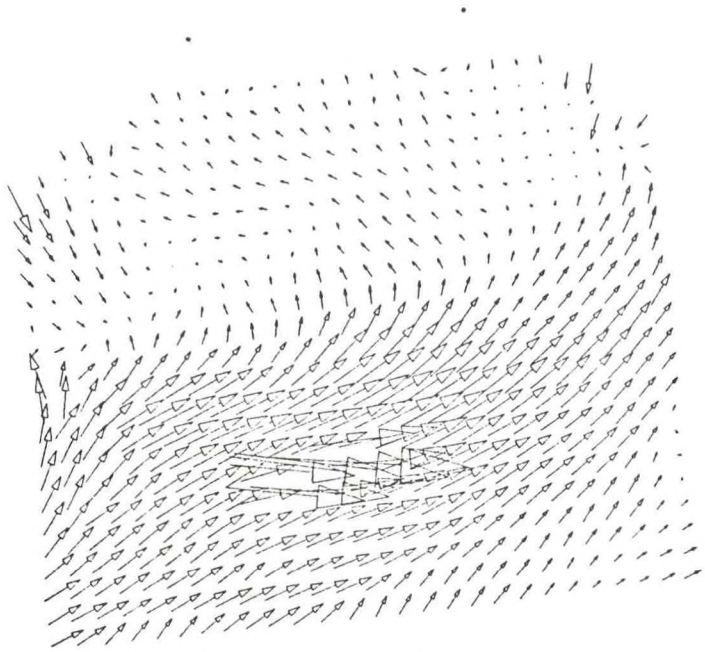
TRUE NORTH ↑



0540 20-OCT-82
0550 20-OCT-82

8.0 KM , 200.0 CM/S

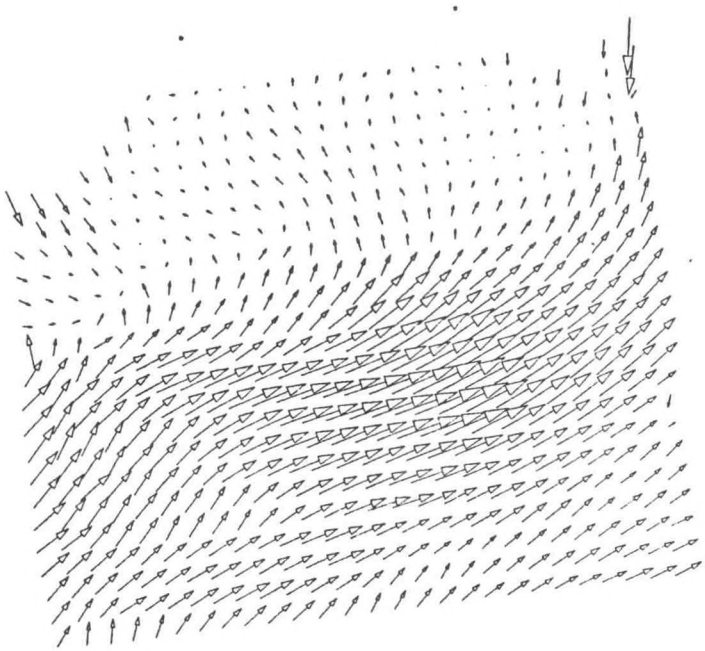
TRUE NORTH ↑



0640 20-OCT-82
0650 20-OCT-82

8.0 KM , 200.0 CM/S

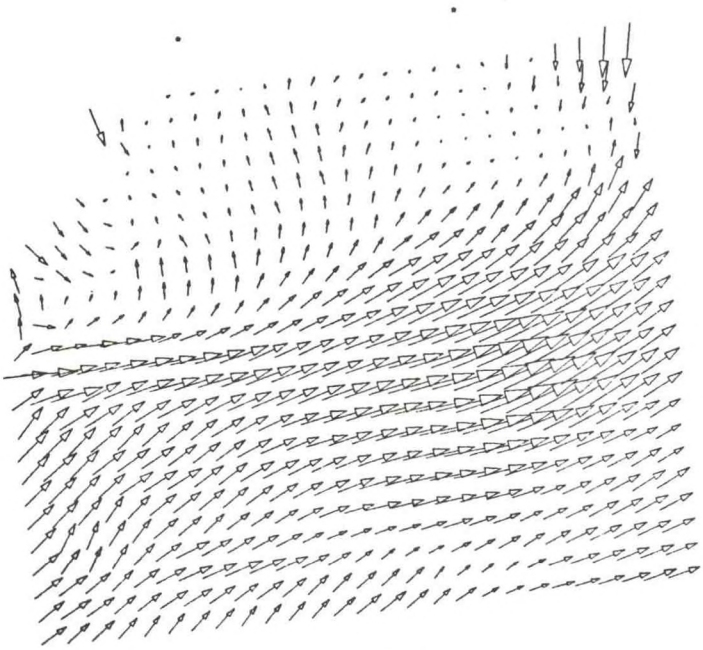
TRUE NORTH



0740 20-OCT-82
0750 20-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0840 20-OCT-82
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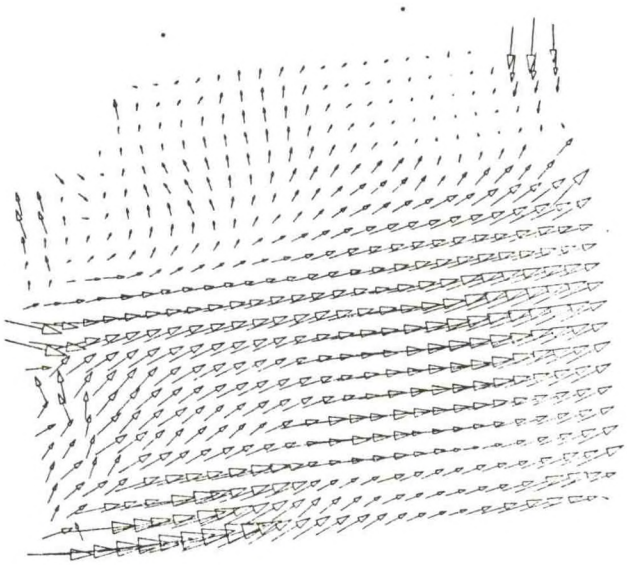
8.0 KM , 200.0 CM/S

TRUE NORTH



0940 20-OCT-82
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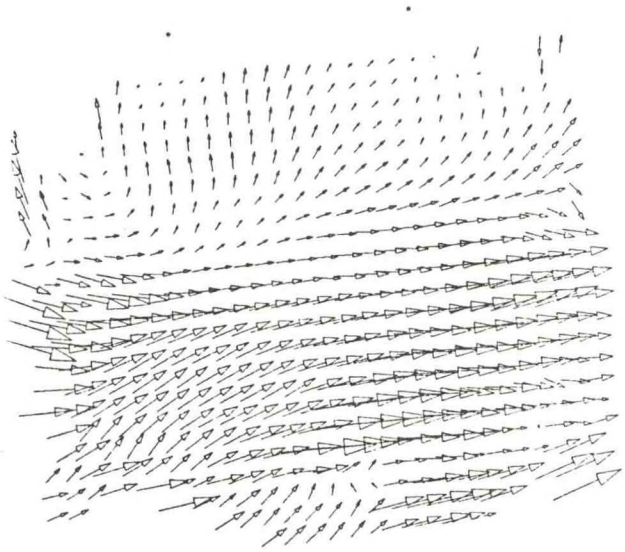
TRUE NORTH



1040 20-OCT-82
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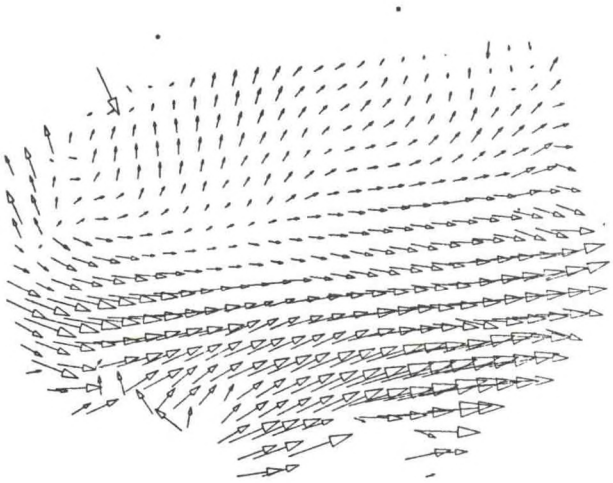
8.0 KM , 200.0 CM/S

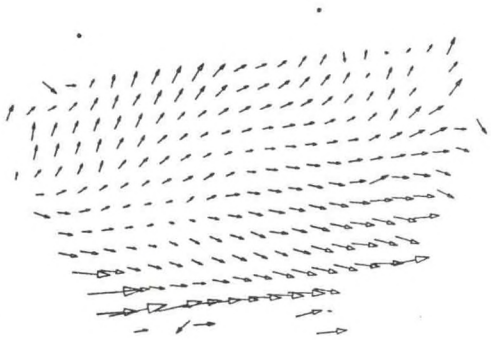
TRUE NORTH



1140 20-OCT-82
1150 20-OCT-82

8.0 KM , 200.0 CM/S

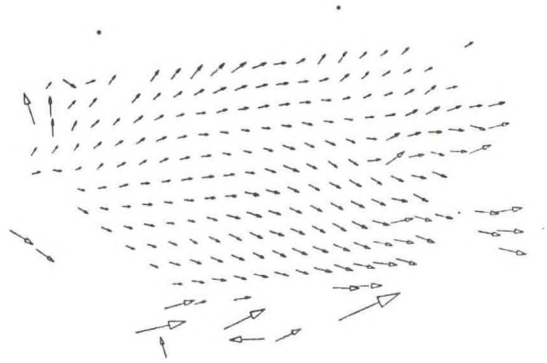
TRUE NORTH



1240 20-OCT-82
1250 20-OCT-82

8.0 KM , 200.0 CM/S

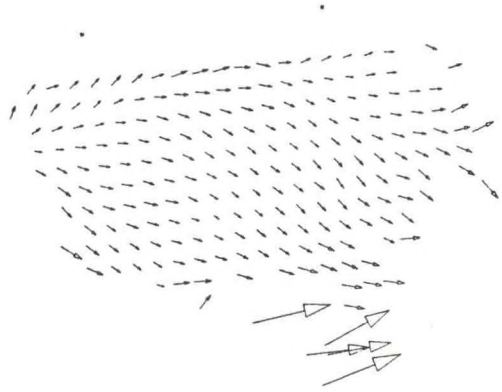
TRUE NORTH



1340 20-OCT-82
1350 20-OCT-82

8.0 KM , 200.0 CM/S

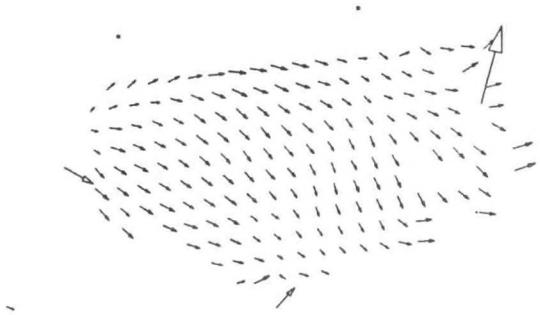
TRUE NORTH



1440 20-OCT-82
1450 20-OCT-82

8.0 KM , 200.0 CM/S

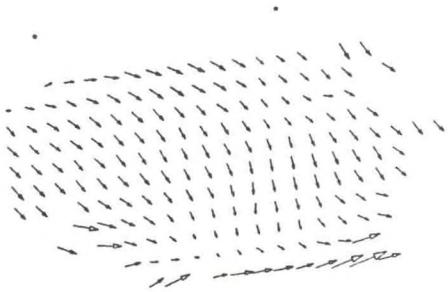
TRUE NORTH



1540 20-OCT-82
1550 20-OCT-82

8.0 KM , 200.0 CM/S

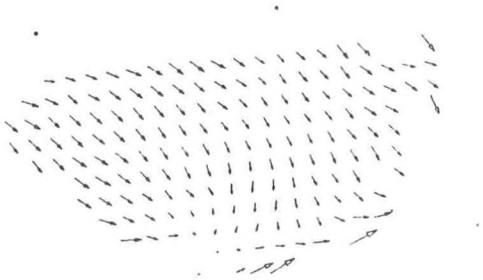
TRUE NORTH



1640 20-OCT-82
1650 20-OCT-82

8.0 KM , 200.0 CM/S

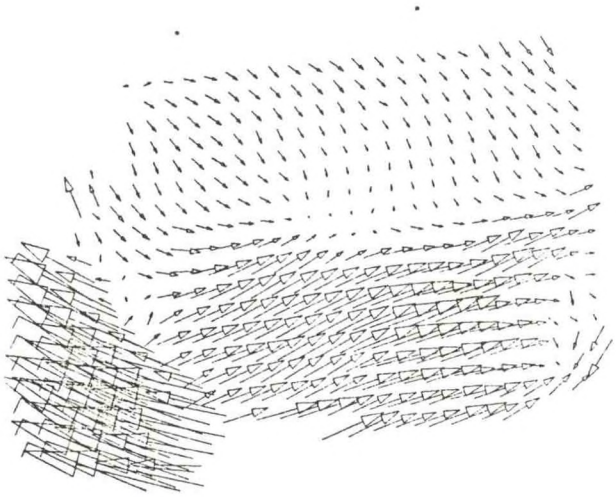
TRUE NORTH



1740 20-OCT-82
1750 20-OCT-82

8.0 KM , 200.0 CM/S

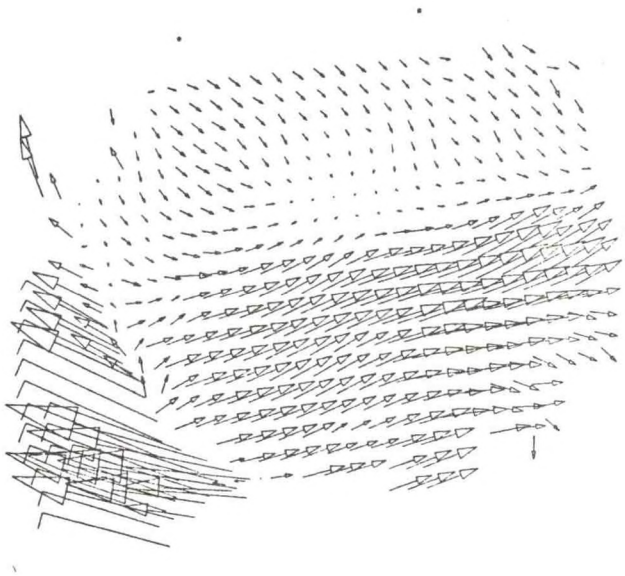
TRUE NORTH



1840 20-OCT-82
1850 20-OCT-82

8.0 KM , 200.0 CM/S

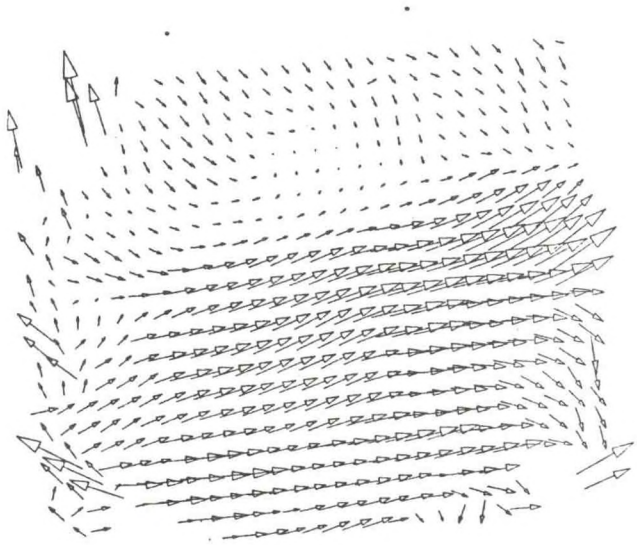
TRUE NORTH



1940 20-OCT-82
1950 20-OCT-82

8.0 KM , 200.0 CM/S

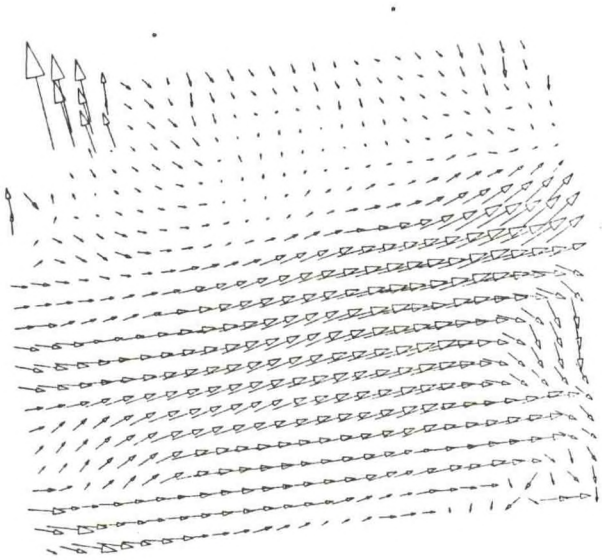
TRUE NORTH



2040 20-OCT-82
2050 20-OCT-82

8.0 KM , 200.0 CM/S

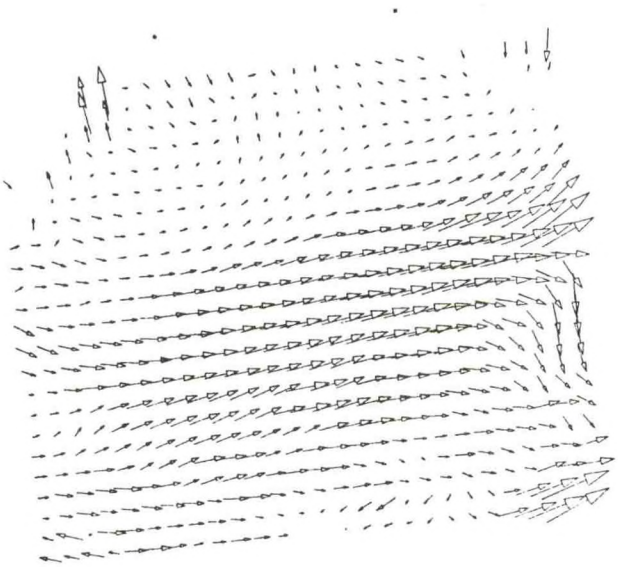
TRUE NORTH



2140 20-OCT-82
2150 20-OCT-82

8.0 KM , 200.0 CM/S

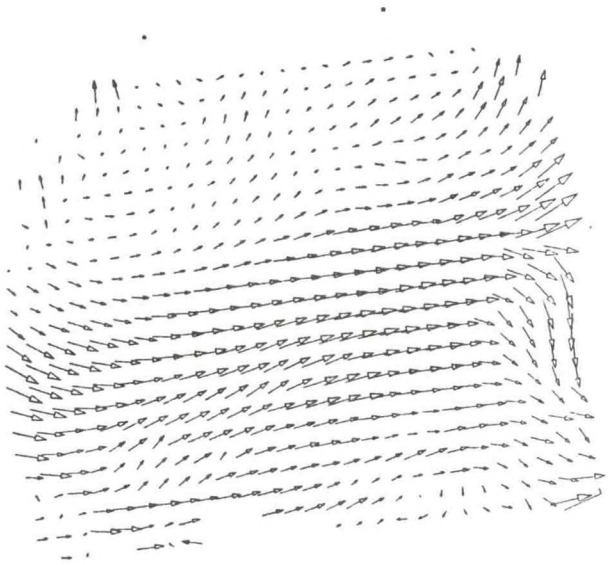
TRUE NORTH



2240 20-OCT-82
2250 20-OCT-82

8.0 KM , 200.0 CM/S

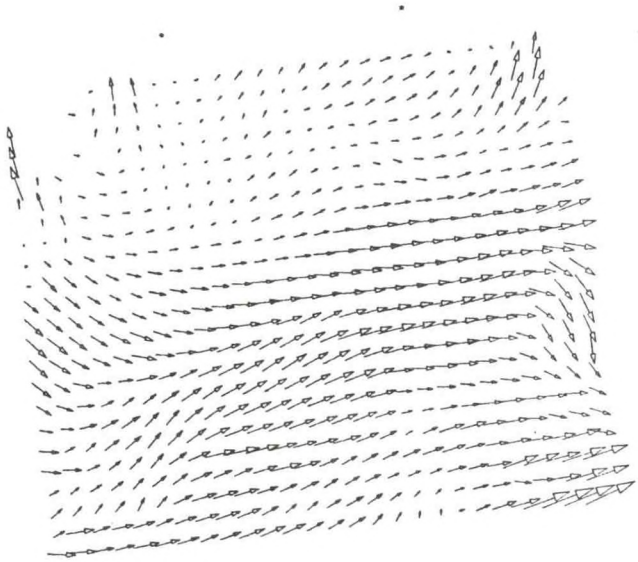
TRUE NORTH



2340 20-OCT-82
2350 20-OCT-82

8.0 KM , 200.0 CM/S

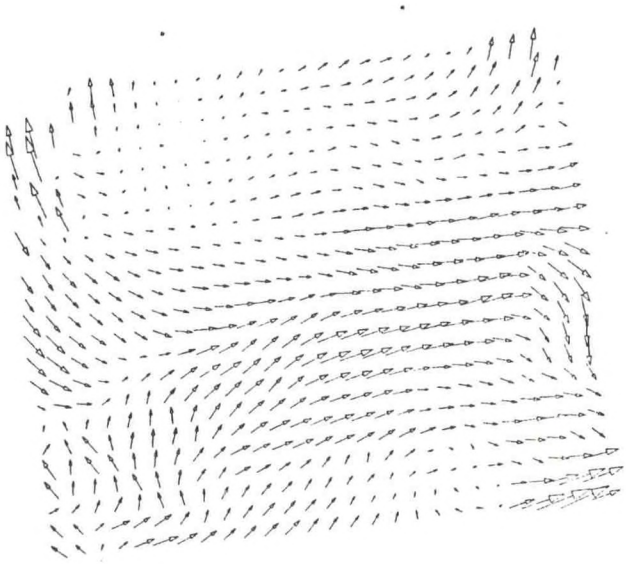
TRUE NORTH



0040 21-OCT-82
0050 21-OCT-82

8.0 KM , 200.0 CM/S

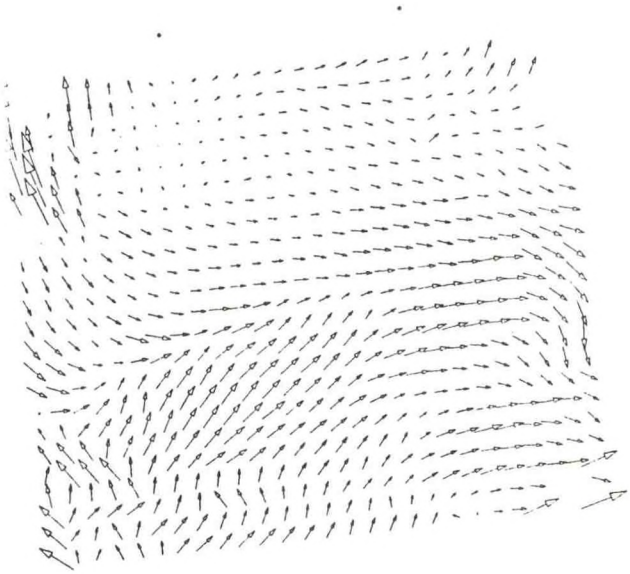
TRUE NORTH ↑



0140 21-OCT-82
0150 21-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑



0240 21-OCT-82
0250 21-OCT-82

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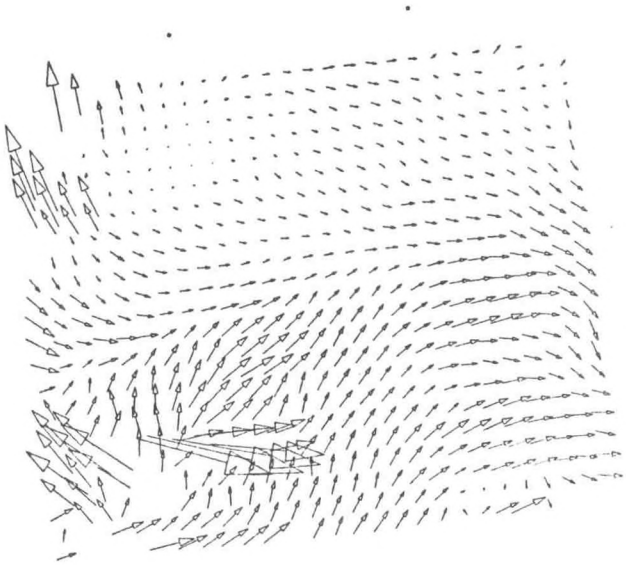
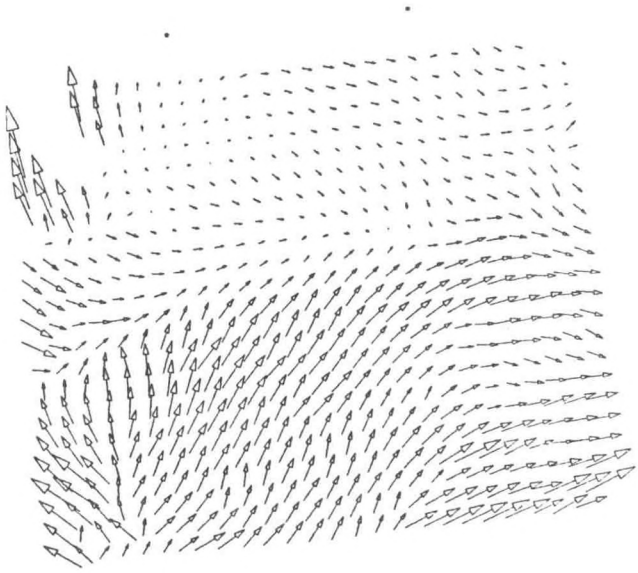
TRUE NORTH



0340 21-OCT-82
0350 21-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0440 21-OCT-82
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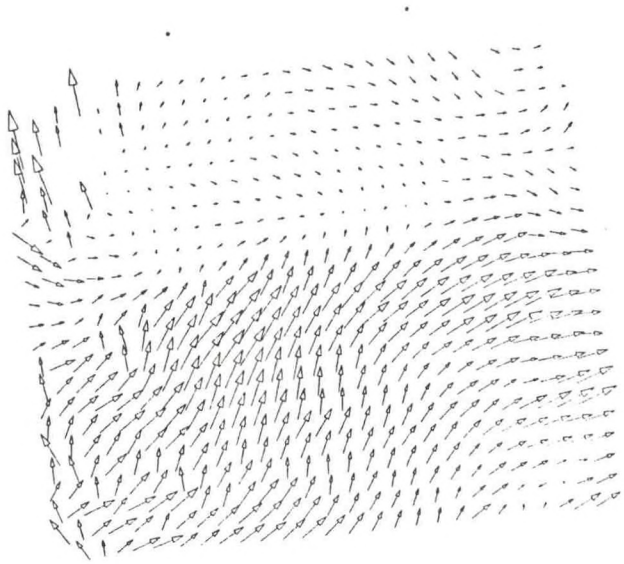

0540 21-OCT-82
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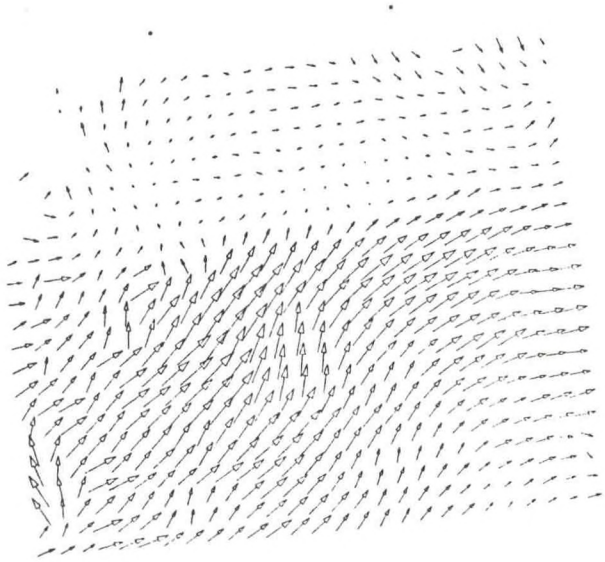
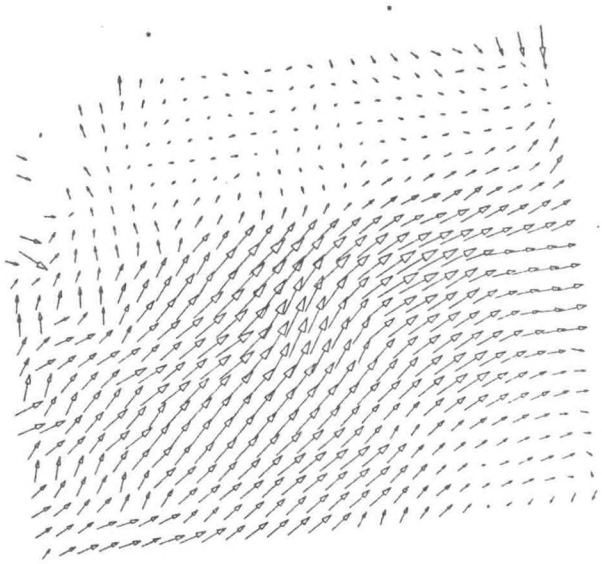
TRUE NORTH



0640 21-OCT-82
0650 21-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0740 21-OCT-82
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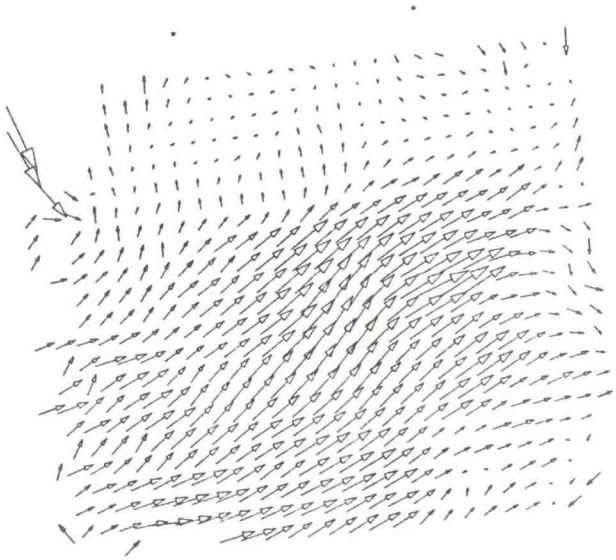
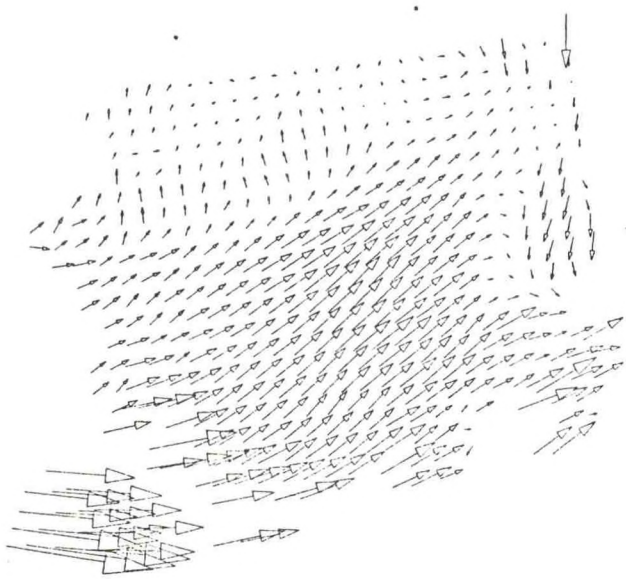
TRUE NORTH



0840 21-OCT-82
0850 21-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH



0940 21-OCT-82
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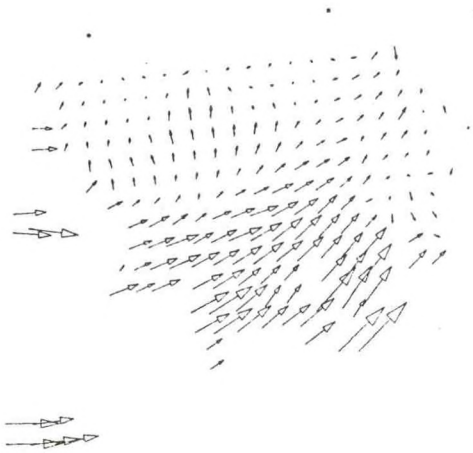
8.0 KM , 200.0 CM/S

TRUE NORTH



1040 21-OCT-82
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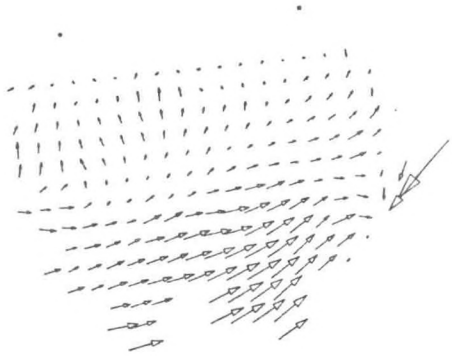
8.0 KM . 200.0 CM/S

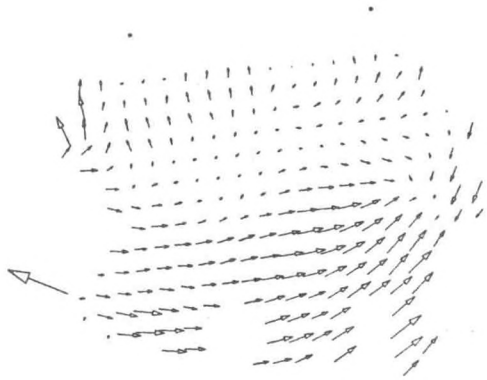
TRUE NORTH



1140 21-OCT-82
1150 21-OCT-82

8.0 KM . 200.0 CM/S

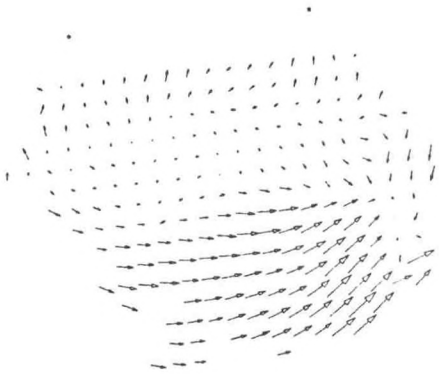
TRUE NORTH



1240 21-OCT-82
1250 21-OCT-82

8.0 KM , 200.0 CM/S

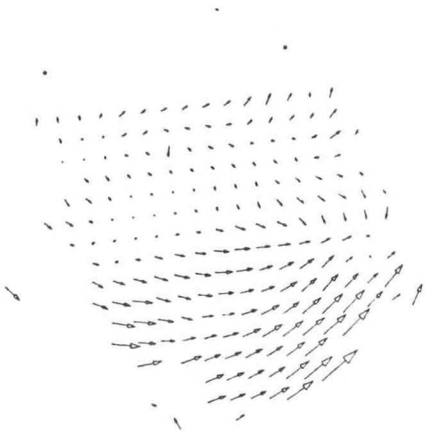
TRUE NORTH ↑



1340 21-OCT-82
1350 21-OCT-82

8.0 KM , 200.0 CM/S

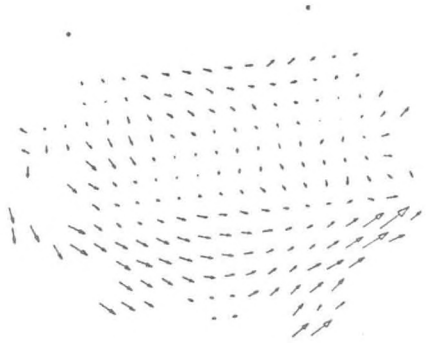
TRUE NORTH ↑



1440 21-OCT-82
1450 21-OCT-82

8.0 KM , 200.0 CM/S

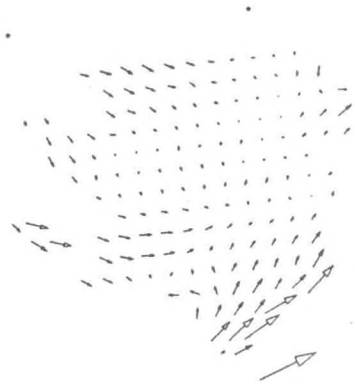
TRUE NORTH



1540 21-OCT-82
1550 21-OCT-82

8.0 KM , 200.0 CM/S

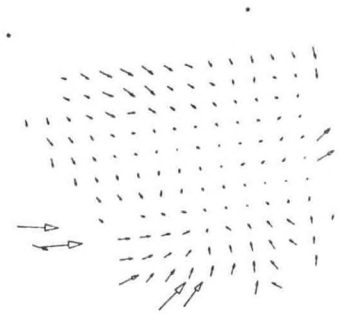
TRUE NORTH



1640 21-OCT-82
1650 21-OCT-82

8.0 KM , 200.0 CM/S

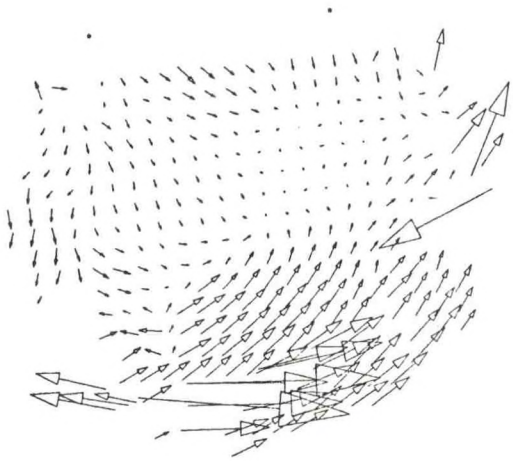
TRUE NORTH



1740 21-OCT-82
1750 21-OCT-82

8.0 KM , 200.0 CM/S

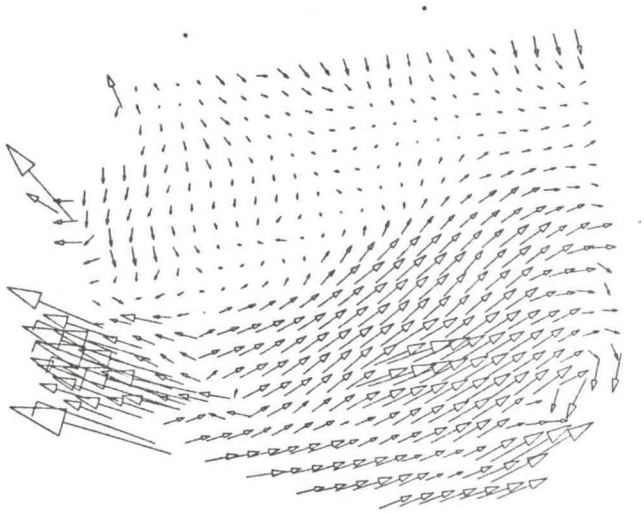
TRUE NORTH



1840 21-OCT-82
1850 21-OCT-82

8.0 KM , 200.0 CM/S

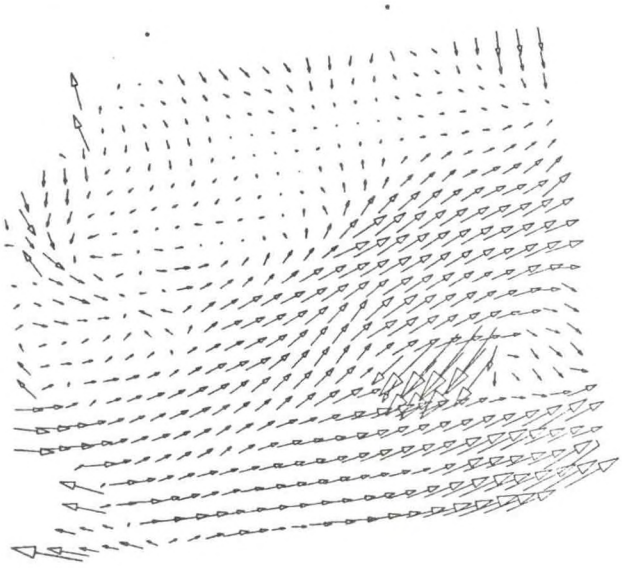
TRUE NORTH



1940 21-OCT-82
1950 21-OCT-82

8.0 KM , 200.0 CM/S

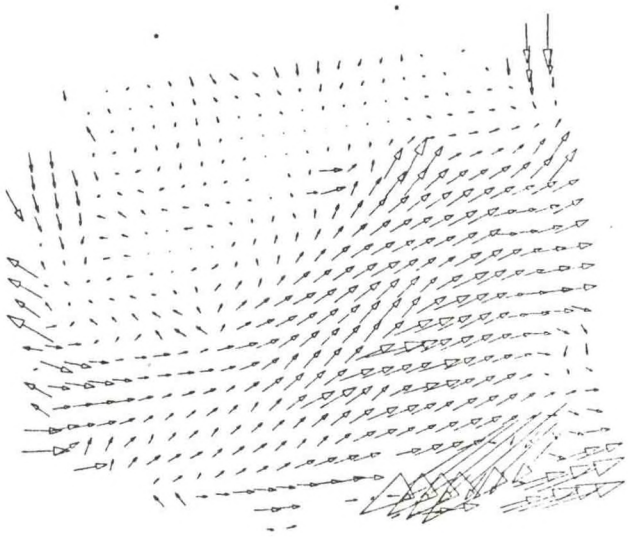
TRUE NORTH



2040 21-OCT-82
2050 21-OCT-82

8.0 KM , 200.0 CM/S

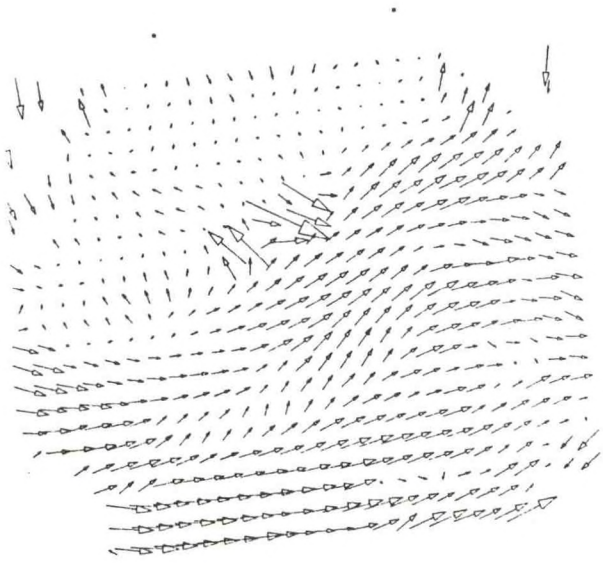
TRUE NORTH



2140 21-OCT-82
2150 21-OCT-82

8.0 KM , 200.0 CM/S

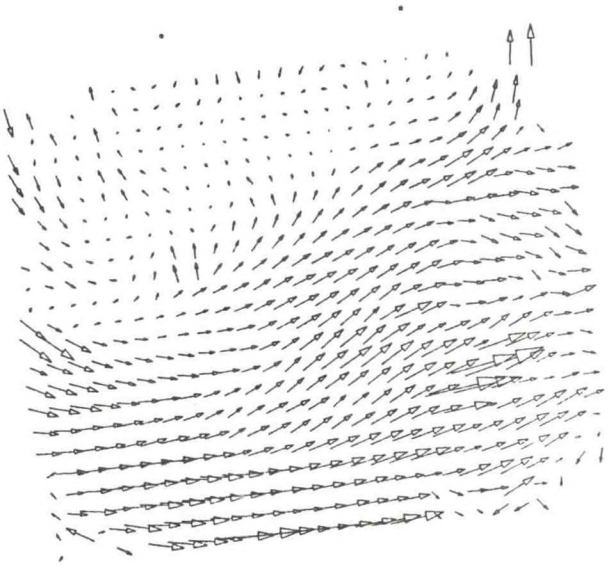
TRUE NORTH



2240 21-OCT-82
2250 21-OCT-82

8.0 KM , 200.0 CM/S

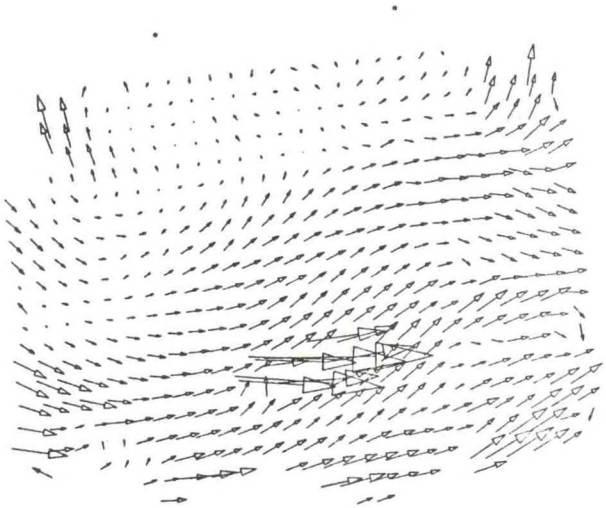
TRUE NORTH



2340 21-OCT-82
2350 21-OCT-82

8.0 KM , 200.0 CM/S

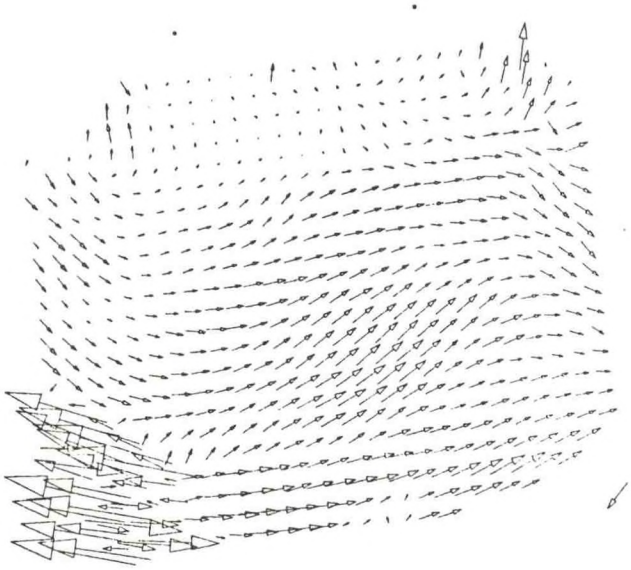
TRUE NORTH



0040 22-OCT-82
0050 22-OCT-82

8.0 KM , 200.0 CM/S

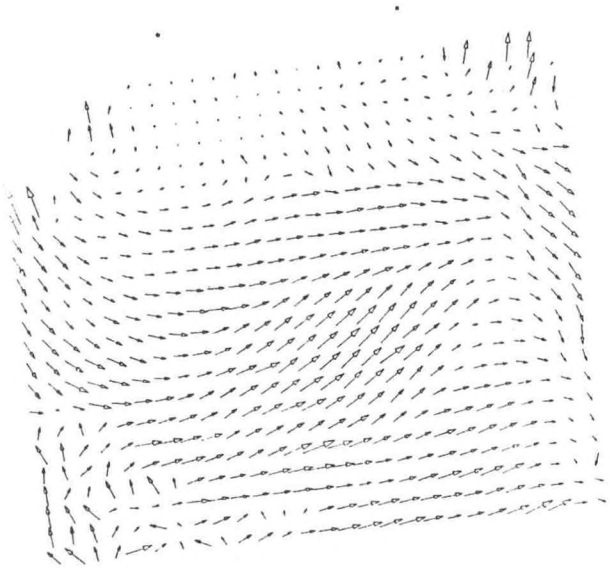
TRUE NORTH



0140 22-OCT-82
0150 22-OCT-82

8.0 KM , 200.0 CM/S

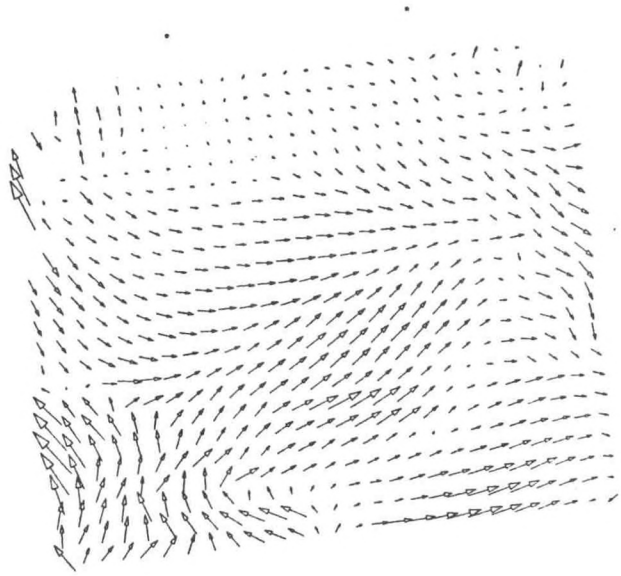
TRUE NORTH



0240 22-OCT-82
0250 22-OCT-82

8.0 KM . 200.0 CM/S

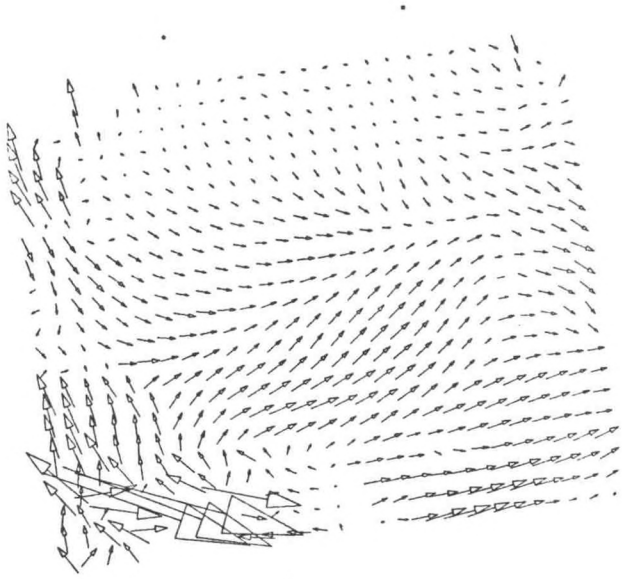
TRUE NORTH



0340 22-OCT-82
0350 22-OCT-82

8.0 KM . 200.0 CM/S

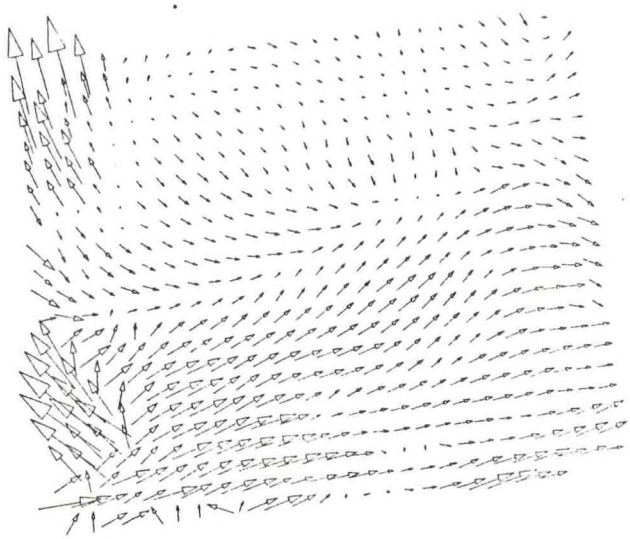
TRUE NORTH



0440 22-OCT-82
0450 22-OCT-82

8.0 KM , 200.0 CM/S

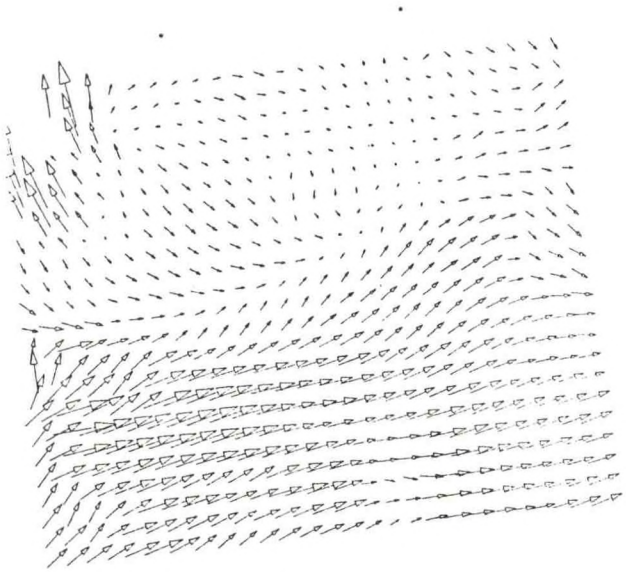
TRUE NORTH



0540 22-OCT-82
0550 22-OCT-82

8.0 KM , 200.0 CM/S

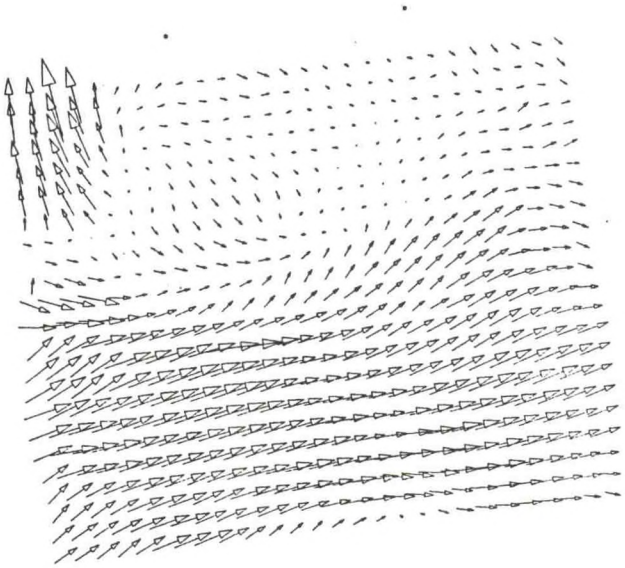
TRUE NORTH



0640 22-OCT-82
0650 22-OCT-82

8.0 KM , 200.0 CM/S

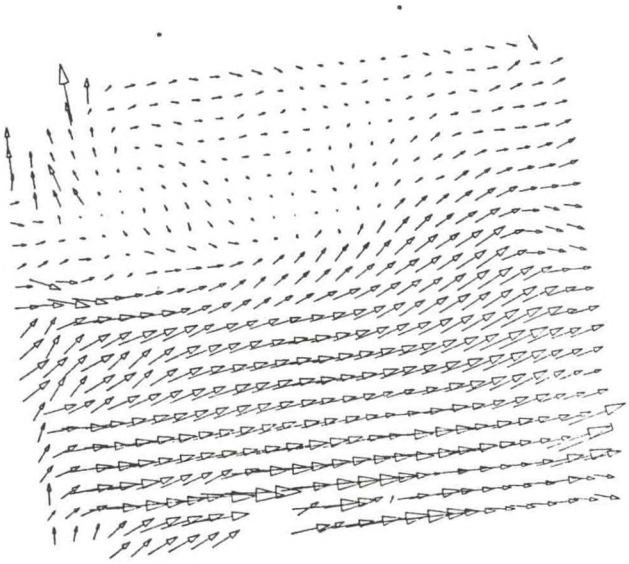
TRUE NORTH



0740 22-OCT-82
0750 22-OCT-82

8.0 KM , 200.0 CM/S

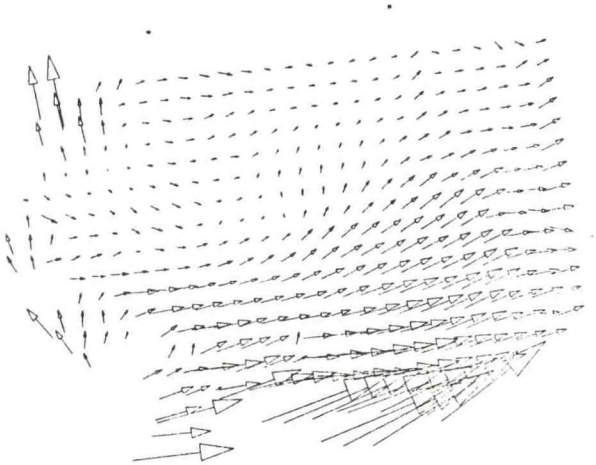
TRUE NORTH



0840 22-OCT-82
0850 22-OCT-82

8.0 KM . 200.0 CM/S

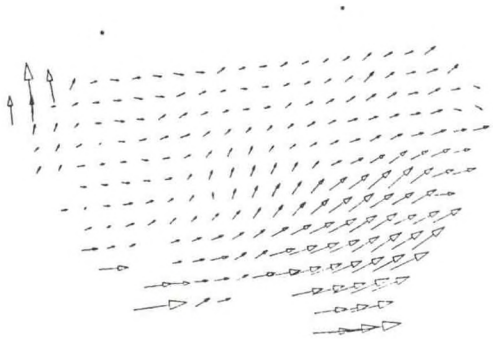
TRUE NORTH ↑



0940 22-OCT-82
0950 22-OCT-82

8.0 KM . 200.0 CM/S

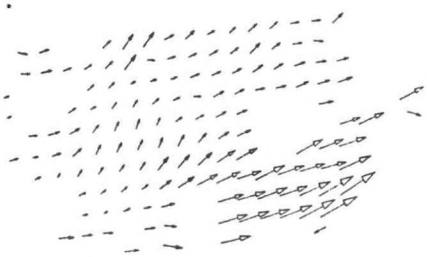
TRUE NORTH ↑



1040 22*OCT*82
1050 22-OCT-82

8.0 KM . 200.0 CM/S

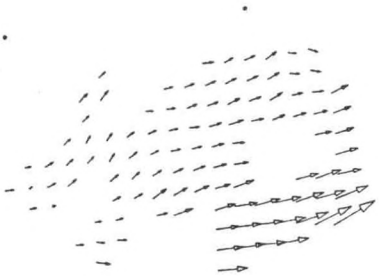
TRUE NORTH



1140 22*OCT*82
1150 22-OCT-82

8.0 KM . 200.0 CM/S

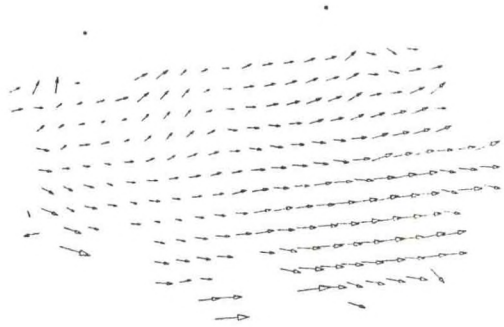
TRUE NORTH



1240 22-OCT-82
1250 22-OCT-82

8.0 KM , 200.0 CM/S

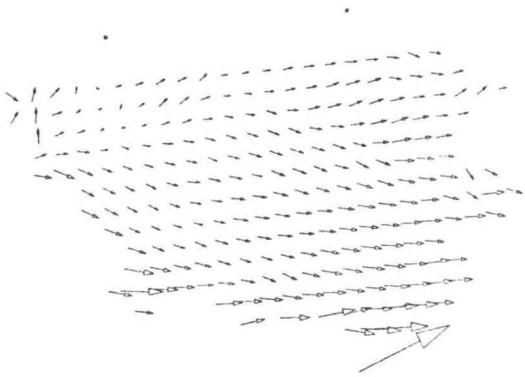
TRUE NORTH ↑



1340 22-OCT-82
1350 22-OCT-82

8.0 KM , 200.0 CM/S

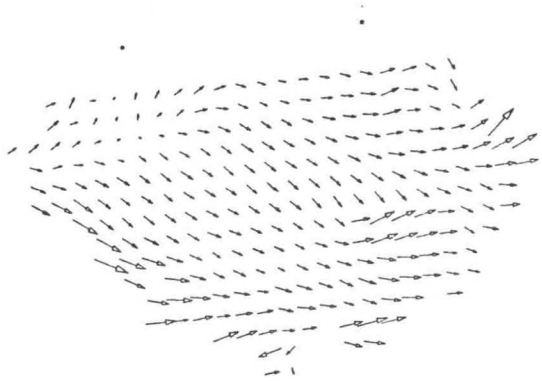
TRUE NORTH ↑



1440 22-OCT-82
1450 22-OCT-82

8.0 KM , 200.0 CM/S

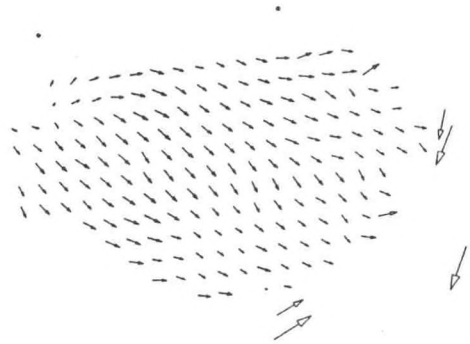
TRUE NORTH



1540 22-OCT-82
1550 22-OCT-82

8.0 KM , 200.0 CM/S

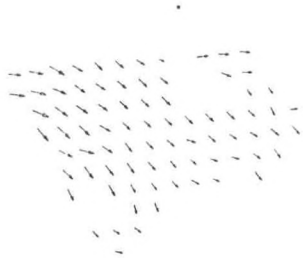
TRUE NORTH



1640 22-OCT-82
1650 22-OCT-82

8.0 KM , 200.0 CM/S

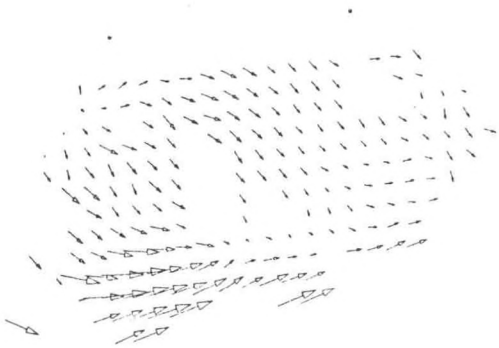
TRUE NORTH



1740 22-OCT-82
1750 22-OCT-82

8.0 KM , 200.0 CM/S

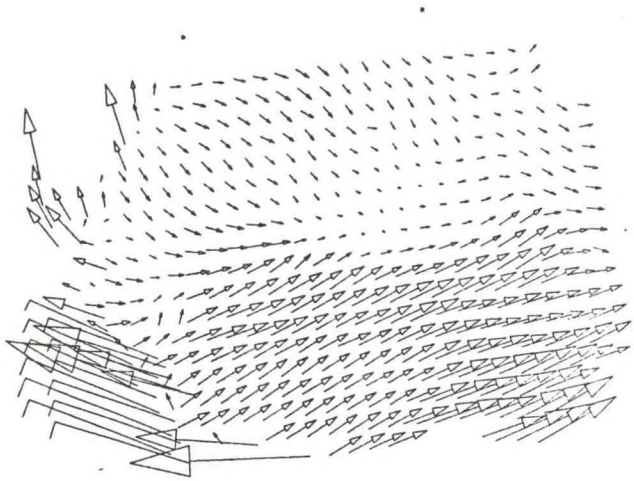
TRUE NORTH



1840 22-OCT-82
1850 22-OCT-82

8.0 KM , 200.0 CM/S

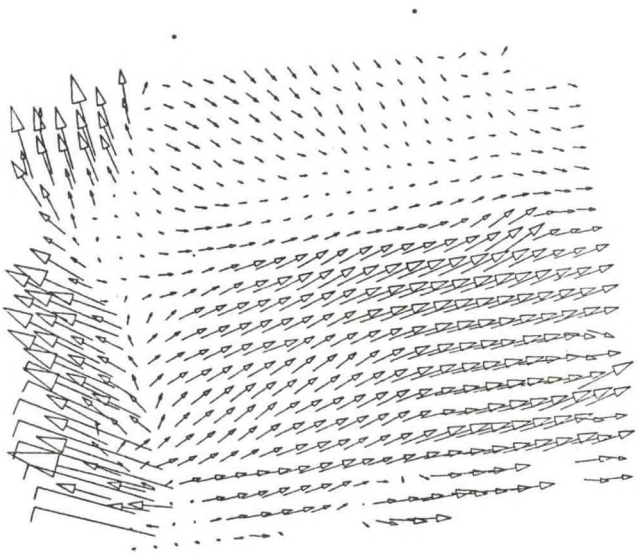
TRUE NORTH



1940 22-OCT-82
1950 22-OCT-82

8.0 KM , 200.0 CM/S

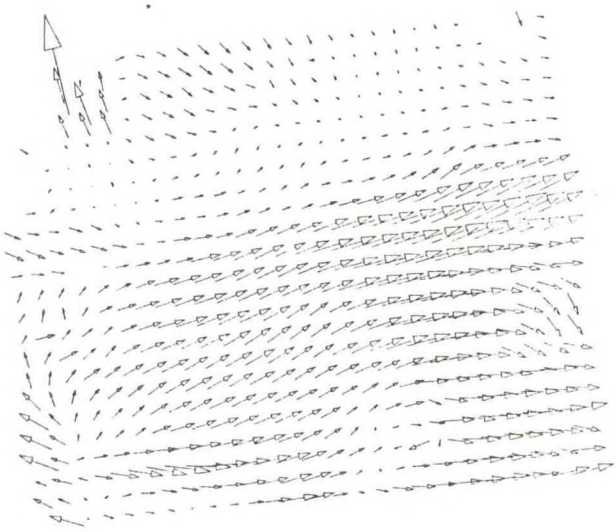
TRUE NORTH



2040 22-OCT-82
2050 22-OCT-82

8.0 KM , 200.0 CM/S

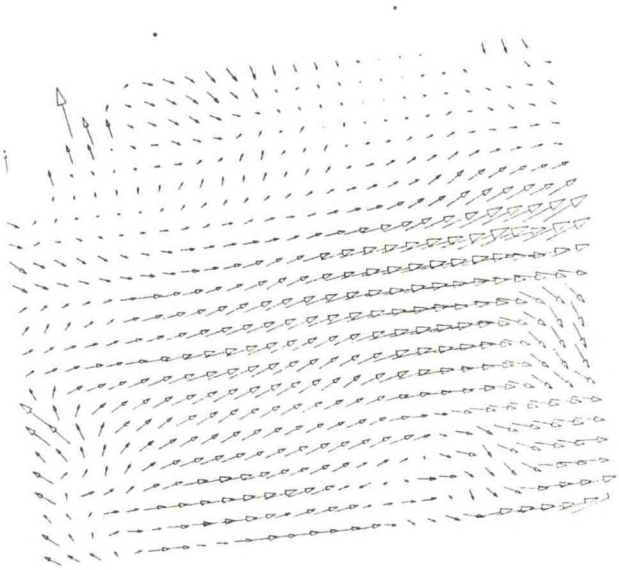
TRUE NORTH ↑



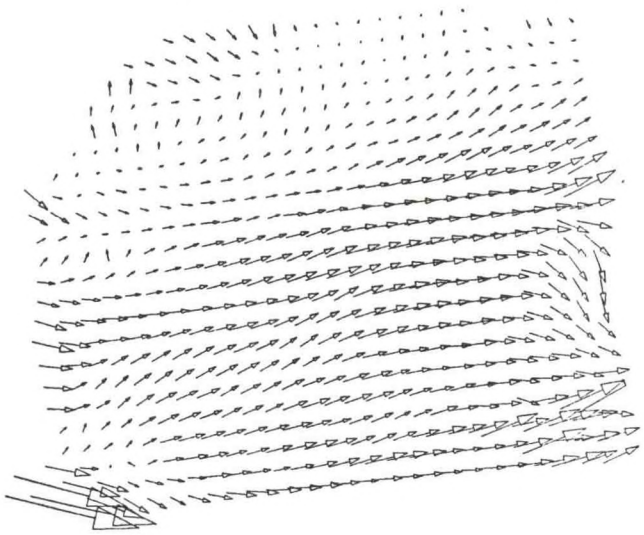
2140 22-OCT-82
2150 22-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH ↑



2240 22-OCT-82
2250 22-OCT-82

8.0 KM , 200.0 CM/S

TRUE NORTH