QUARTERLY REPORT

July 17, 1979

APPLICATIONS OF HCMM DATA TO SOIL MOISTURE SNOW AND ESTUARINE CURRENT STUDIES

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A. Problems

With the power stablization of the HCMM spacecraft and the receipt of 32 images since March 22 (22 images since June 1 alone), most of the problems cited in the past quarterly report have been alleviated. Tape orders now take 4 to 6 weeks to be filled, not unusually along; but a shorter turn-around time would be appreciated.

B. Accomplishments

The data collection platform (DCP) has been received from La Barge, Inc. Work is proceeding on interfacing the DCP with the electronics from the soil moisture gauge. Completion, including installation as well as calibration of the gauge is still on schedule for October 1979.

On Wednesday June 13, 1979, HCMM passed over the Luverne test site on a night/day sequence (0803GMT & 1858GMT respectively). A major data collection effort was carefully planned in conjuction with the HCMM overpasses. The effort involved the cooperation of personnel from NESS and NWS's Office of Hydrology, NASA/JSC and USDA/ Soil Conservation Service. Limited ground data, 6 locations only, were collected with predawn overpass. These data included 10-cm (4-inch) soil samples, surface temperatures, and 10-cm temperatures. Extensive ground-based data were collected during the day. Over 60 soil samples and 30 sets (surface and 10-cm depth) of soil temperatures were obtained by two, two-man teams between 1600 GMT and 2200 GMT.

Meanwhile, four satellites collected data over the test site: NASA's Heat Capacity Mapping Mission (HCMM) satellite and Landsat-2 and the NOAA-operated TIROS-N and SMS-2 satellites.

Aircraft from NASA and NOAA collected data in the visible and Thermal-IR and gamma-ray portions of the spectrum respectively.

Receipt of aircraft and satellite data is not expected for several months, however preliminary compilation of the ground data is completed and will be included in the next repor Intitial plots of the raw daytime soil moisture and temperature data are found in figures 1-6. The surface temperatures, figure 1, appear to vary almost randomly, mostly between 31 and 44°c. Those at the 10-cm depth, figure 2, have a more restricted range (18 to 25°c). A large portion of the surface temperature variation is due to diurnal effects (temperatures were collected from 11 am (1600GMT) to 5 pm (2200GMT) local daylight time). Except for one soil moisture value at 43.5 percent, the moisture content of the samples are clustered near 26 percent ranging from 22 to 30 percent (figure 3). Figures 4 and 5 show that there is little correlation between soil moisture and temperature whether at the surface or at 10-cm depth. Figure 6 summarizes the data by displaying square mile (section) averages.

Additional analyses of the ground data will consider the diurnal variation of the surface temperature. Further evaluation of the data will be postponed until receipt of aircraft and satellite images and tapes.

John Pritchard of the NESS Computation Group, has developed a program that produces a rectified 1:250,000-scale computer printout of a HCMM tape that corresponds well with a standard USGS map at the same scale. Figure 7 shows one such example showing a portion of the lower Potomac River (marked as W's).

C. Significant Results

None

D. Publications

None

E. Recommendation

None

F. Finds Expended to Data

Balance of funds	1.5 K
Spent this period	1.2
Funds remaining	0.3 K

G. Data Utility

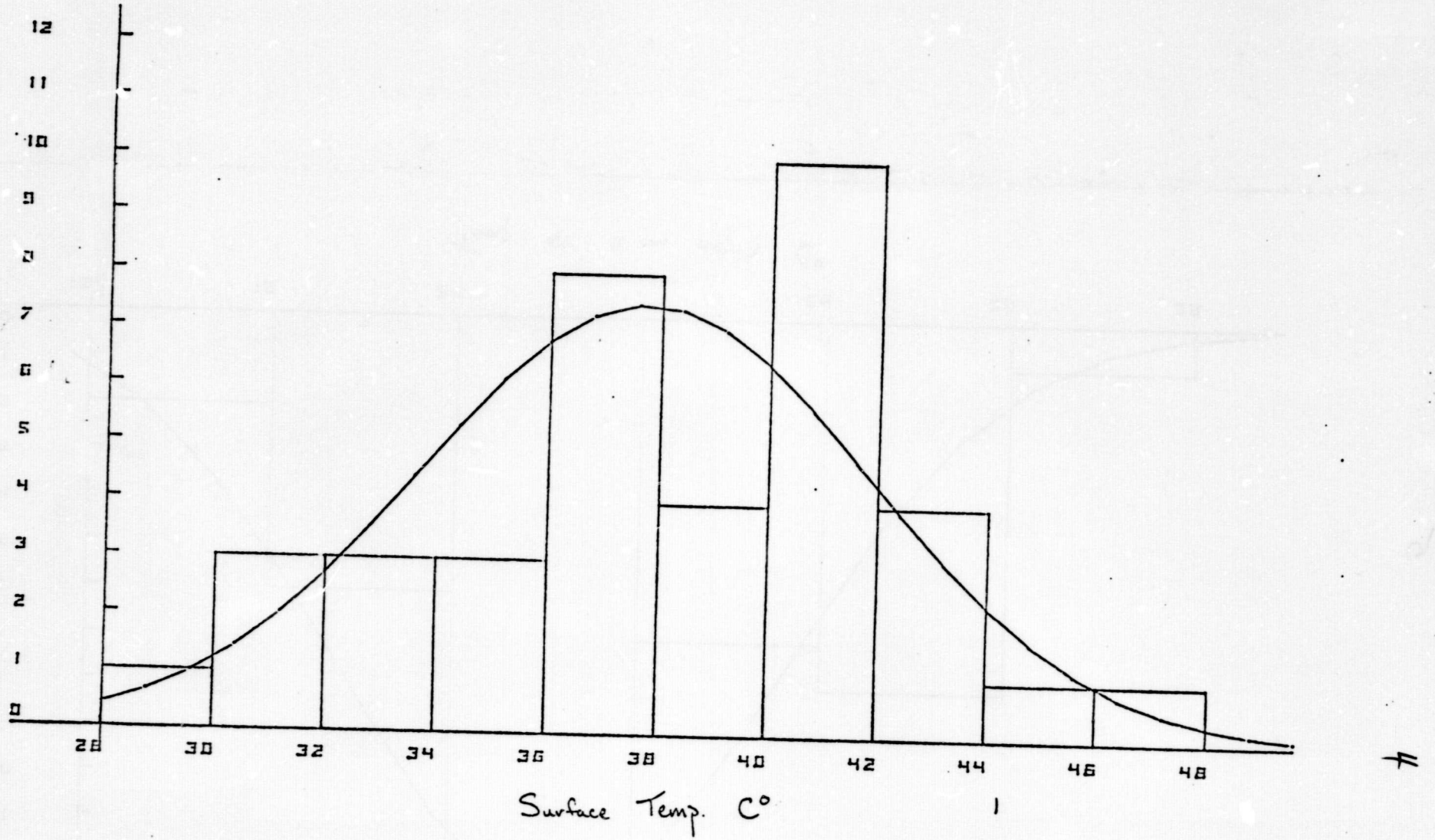
Positive transparencies and prints are of good photographic quality but suffer a limited dynamic range of gray scale whenever bright clouds are present (visible only). Tapes for 2 scenes ordered, one received and of good quality.

H. Future Plans

Our major effort during the next quarter will be centered on the 6/13/79 Luverne data set. HCMM images received will be examined and CCT's ordered for those scenes determined to have useful information for our studies.

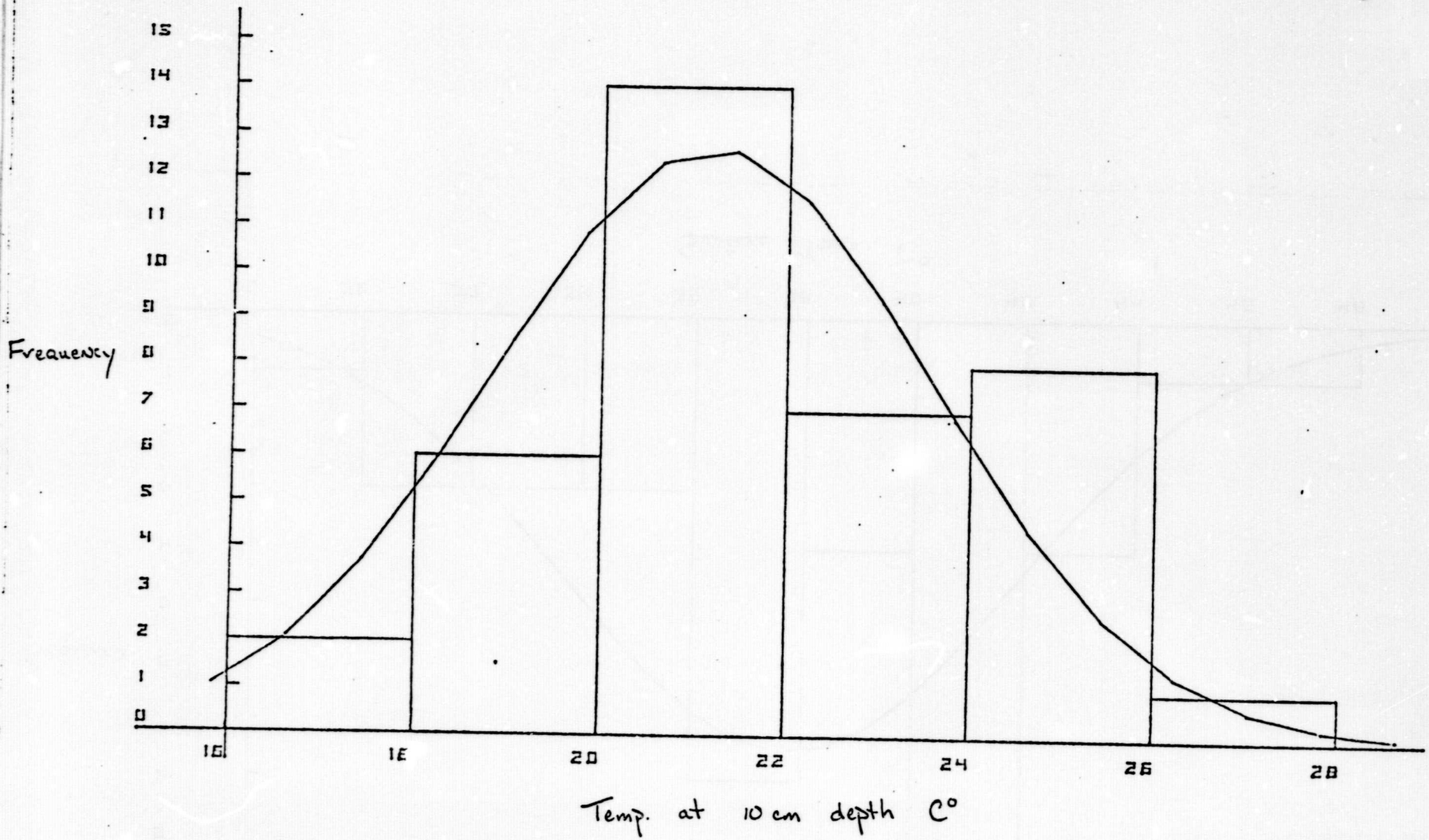
June 13, 1979 (day)

Figure 1



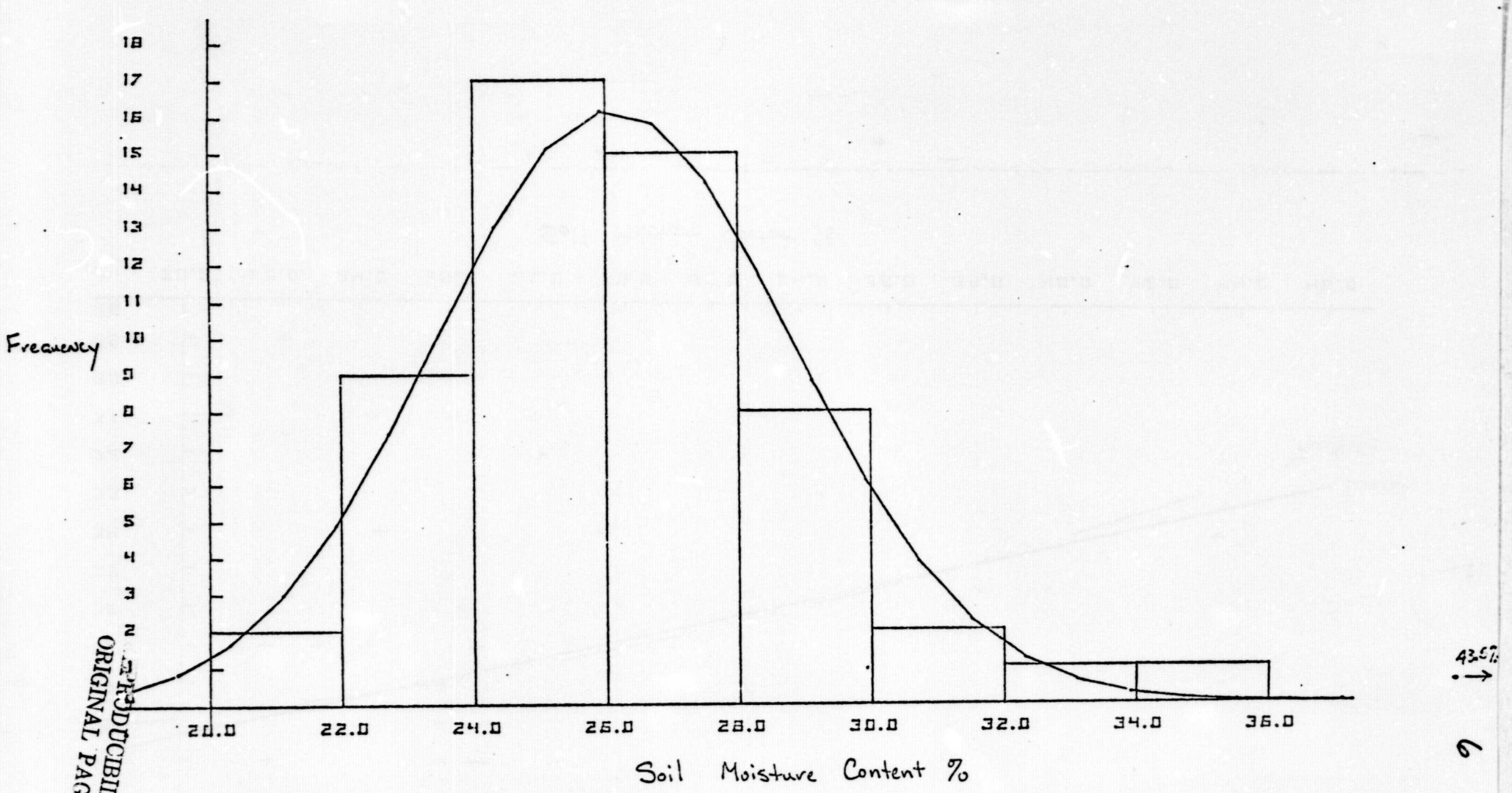
June 13, 1979 (day)

Figure 2



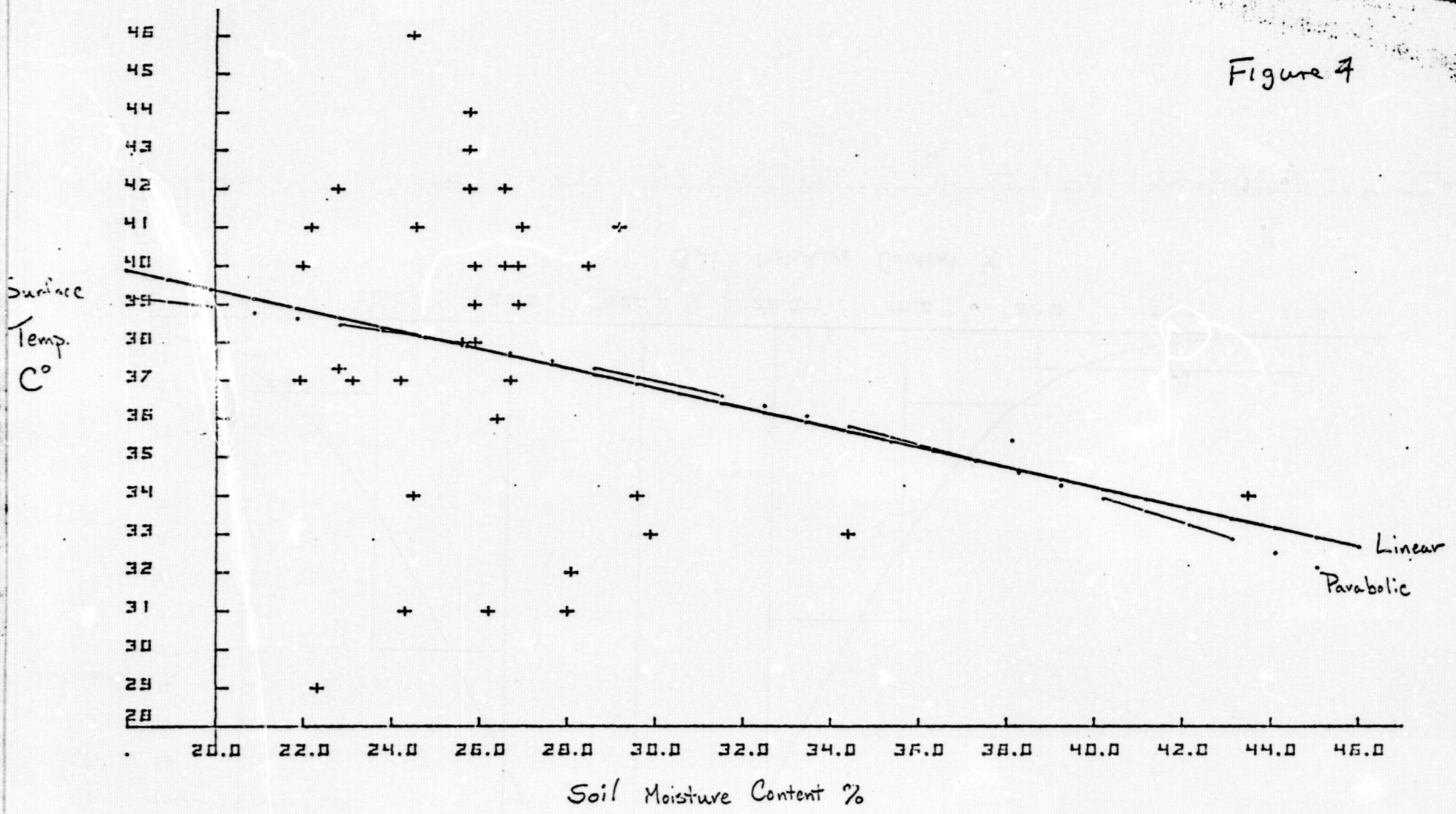
June 13, 1979 (day)

Figure 3



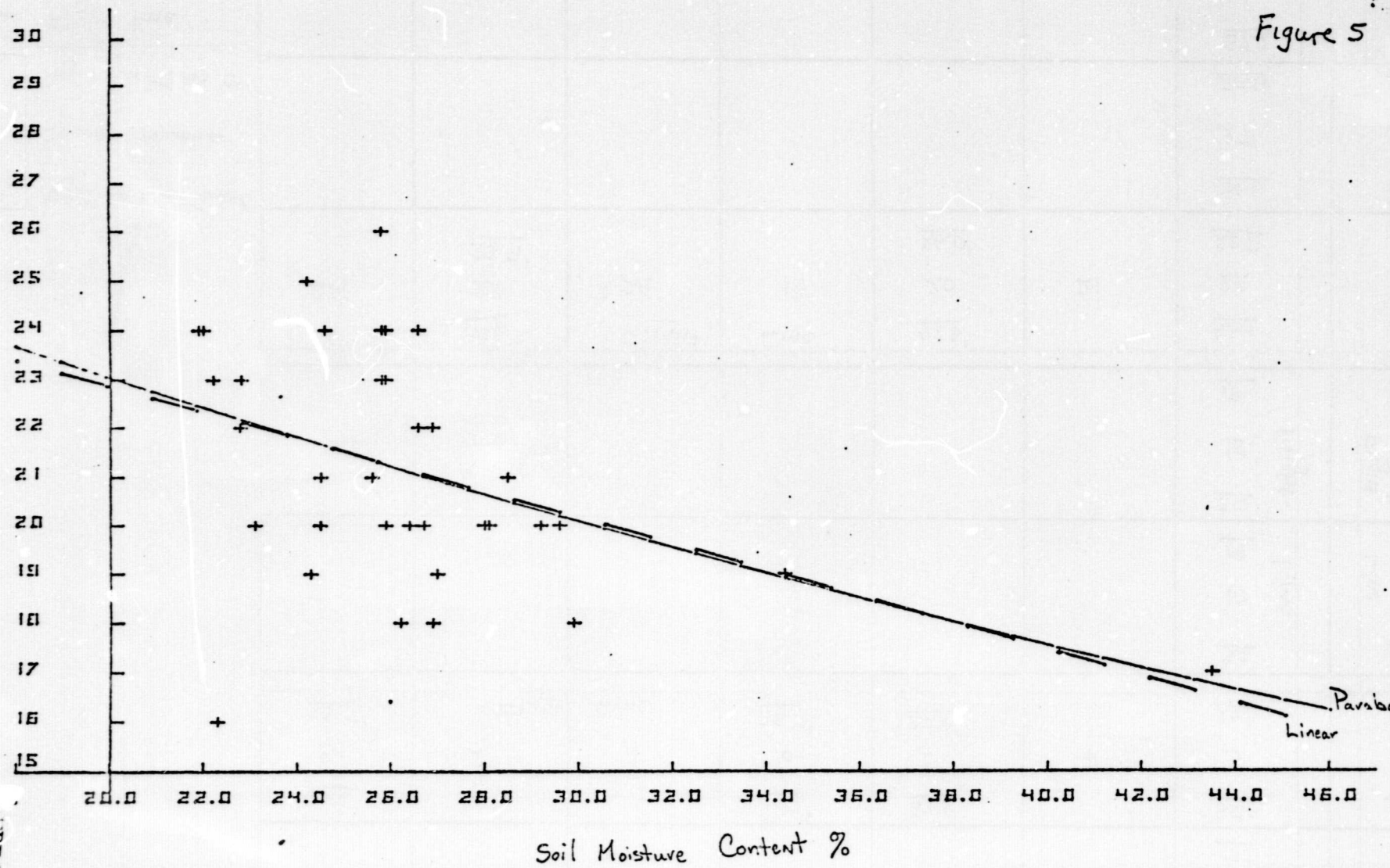
June 13, 1979 (day)

Figure 4



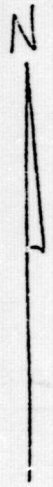
June 13, 1979 (day)

Figure 5



June 13, 1979 (day)

FIGURE 6



						33 27 16	26
						32 34 19	35
40.2' 3 23.7'	2	1	41.2' 6 23.7'	37.3' 5 22.0'	4	35.3 3 20.3	39 2 22
						32 10 19	39 11 22
						32 15 18	40 14 22
22	39.6' 23 23.8'	Flight Line		42.3' 20 26.0'	21	43.1 22 22.8	40 23 23
						40.6 27 20.6	39 26 22
						37.7 34 20.9	38 35 20

Flight Line 6

39.6	Avg. Surface Temp C°
23	Section Number
23.8	Avg. 10cm Temp C°

——— Flight line

39.6' only one value recorded section

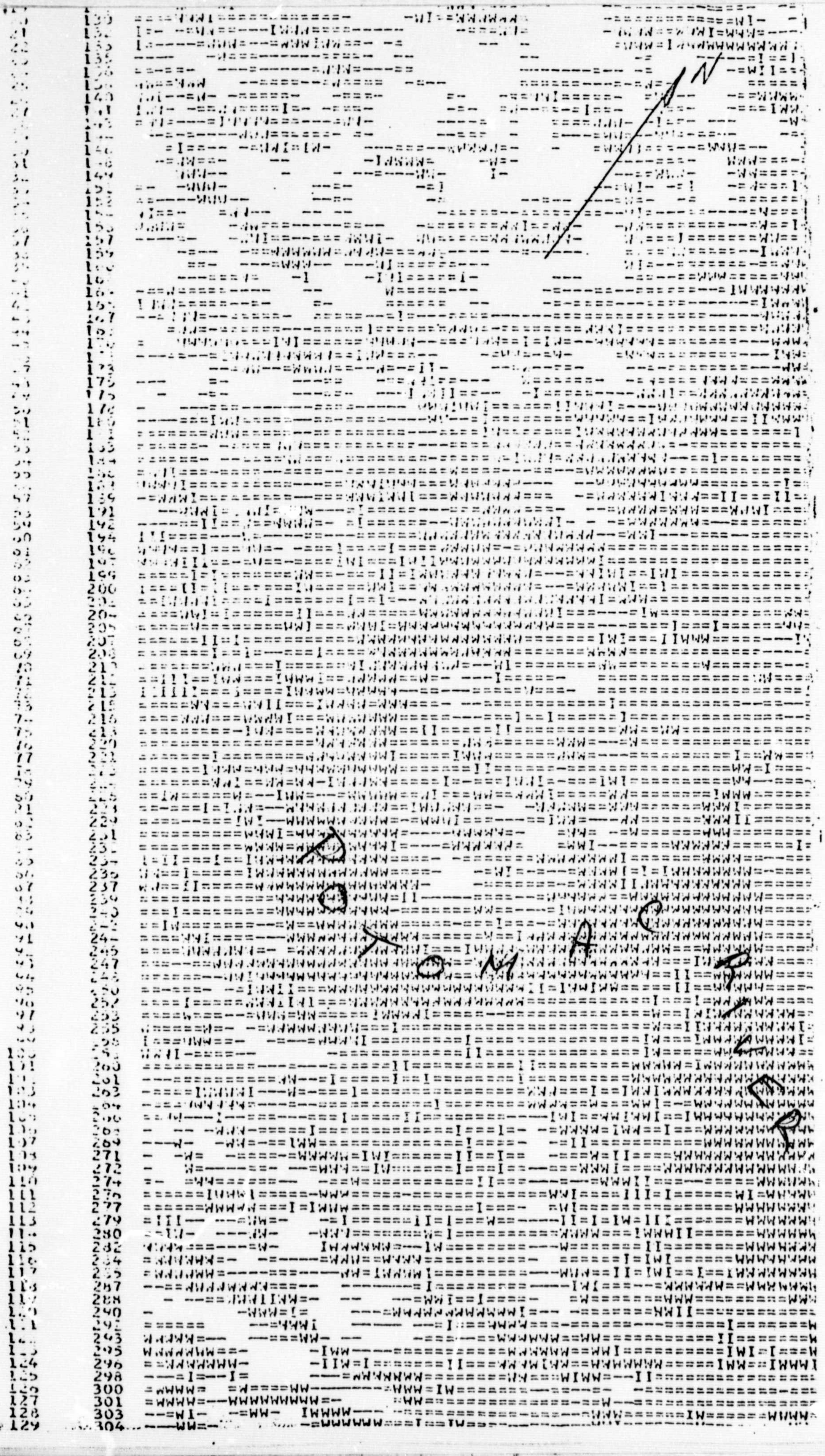


Figure 7